Rural college graduates: Who comes home?

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Abstract

Many rural communities throughout the United States have experienced brain drain, or the out-migration of educated young people. Explanations for why college-educated adults leave rural communities have relied on economic rationales; however, the effects of social identities, community context, and place attachment have also been shown to influence migration decisions. Using data from the National Longitudinal Study of Adolescent to Adult Health (Add Health), this study examines factors experienced during adolescence as well as postsecondary characteristics that promote college graduates' return to their rural communities when they are between the ages of 34 and 43. We find that among college graduates who had attended a rural public K-12 school, those who had higher levels of school attachment were significantly more likely to return home compared to graduates who had lower levels of school attachment. The findings also suggest that graduates who came from a lower college-educated community were more likely to return home than those from average or highly college-educated communities. By analyzing long-term outcomes, this study extends our understanding of the strengths of adolescent experiences and neighborhood context influencing the pull to return home and the support for policies strengthening rural communities as there may be long-term effects to returning home, even if youth leave for college.

Keywords

return migration; college graduates; school context; neighborhood characteristics

The "brain drain" phenomenon, which is described as the funneling out of talented young people from rural areas in search of better opportunities, has been a critical issue plaguing rural communities for decades (Brooks, Lee, Berry, and Toney 2010; Carr and Kefalas 2009; Gibbs 1998; Johnson 2003; Petrin, Schafft, and Meece 2014; Sherman and Sage 2011). Scholars primarily have attributed this population decline to shifts in the United States economic structure and lack of labor market opportunities (De Jong and Blair 1994; Falk and Lobao 2003; Marré 2014). This residential outmigration pattern is strongest among rural 25-year-olds with bachelor's degrees, contributing to lower educational attainment levels within rural communities (Fiore et al. 2015; Gibbs 1998).

Largely, explanations for why educated adults leave rural communities have relied on economic rationales; however, recent studies have shown that non-economic factors, such

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as the salience of social identities (Haley 2018), community context (Fiore et al. 2015), and place attachment and strong social ties (Rérat 2014; Wolfe, Black, and Welser 2020), influence migration decisions. There is little research on the factors that promote rural college graduates' return migration nor follows young adults over the life course to understand how their experiences and habitus during their teenage years impact college and career trajectories. College graduates who return to rural areas (i.e., "brain gain") can play critical roles in their community's development, by replenishing the population, generating jobs, and increasing the labor supply of knowledge economy workers as well as the demand for goods and services (von Reichert, Cromartie, and Arthun 2014a). Not only are there human capital benefits, but also social ones: college graduates have used their existing connections and community acceptance to build collective action and political change through sharing new knowledge, ideas, and practices (Stack 1996).

Given that individuals' experiences of racism, sexism, and classism, economic motivators, social ties, and community context have been shown to affect migration behaviors, the purpose of our study is to examine how these factors experienced during adolescence, in addition to the college context, influence the residential directions of rural college-educated adults in terms of returning to their home communities (i.e., return mobility). We use the National Longitudinal Study of Adolescent to Adult Health (Add Health) to answer the following research questions:

> RQ1: What are the migration patterns of college graduates from rural areas, as defined by the 1990 U.S. Census' non-urban block groups?

> RQ2: What characteristics of rural schools and communities are associated with college-educated adults' return to their census tract versus county or state?

Literature Review

Migration patterns and residential mobility in the United States have been widely researched in sociology and demography, with scholars noting factors that impact both forced and voluntary movement between states, counties, census tracts, distances, or locales. Throughout the literature, residential mobility and migration seem to be used synonymously - based on a change of address often triggered by employment, college, or residential dissatisfaction (Burke and Edelman 2008; Lobao, Hooks, and Tickamyer 2007; Long 1988; Warner and Sharp 2019; Wolfe et al. 2020). Across the literature, however, authors tend to use migration as a "final" location and mobility as multiple movements that occur over the life course. Understanding what influences a move away or a return to the home community after completing a college degree has implications for both individual well-being and community economic and social development, such as the opportunity to generate new jobs or higher levels of volunteerism. This is particularly important for the revitalization of rural communities, because the social forces involved in the process and effects of rural return mobility may operate in fundamentally different ways from the urban context (Fiore et al. 2015; Golding and Winkler 2020). Further, research on these trends can assist community and state leaders with enacting targeted strategies to promote return migration, contributing to the public good and return on investment. In this section, we review the literature regarding determinants of residential mobility generally and rural migration specifically.

Factors Related to Residential Mobility

Historically, residential mobility has been thought of as a voluntary, opportunity-related process for individuals and families to move to improve their socioeconomic status and quality of life, whether that be with a job change, higher income, better house, safer neighborhood, or a better school district (Grassmueck, Goetz, and Shields 2018; Shields, Goetz, and Wang 2005; Spring et al. 2017). College graduates often make mobility-related decisions based on the available opportunities to use their education, the potential for advancement and travel, above-average salary offers, and the importance of the work (Braswell and Gottesman 2001). For example, Pennsylvanian adults ages 25-34 moved based on overall economic factors within the new county, such as lower unemployment rates, more health care services, a higher proportion of young people, and greater housing affordability (Grassmueck et al. 2018). This economic view on residential mobility, particularly regarding rural outmigration, has been the basis for defining brain drain.

Other studies, however, argue that mobility between states and smaller levels of geography have been shaped by more than economic arguments, as individuals have returned despite the lack of economic opportunities (Haley 2018). Researchers have found that social identities (Foulkes and Schafft 2010; Ishitani 2011; Parsad and Gray 2005), place (Clark 2017; Spring et al. 2017), and educational pathways (Groen 2004; Ishitani 2011) also play roles in residential mobility. Exploring non-economic factors related to migration patterns provides a more nuanced view of the sociocultural dynamics that individuals experience in their hometowns and during college. A better understanding of the complexity associated with migration can help school and community leaders design more effective interventions to encourage youth to return home.

Social Identity—Demographic characteristics and social identities influence residential mobility and patterns of migration. Migration patterns differ by gender, owing to experiences that follow gendered patterns. In studies of college graduates, men have been more likely than women to migrate to another state (Groen 2004; Parsad and Gray 2005), though this finding may be due to program of study. Parsad and Gray noted men were more likely to major in engineering or science, which was where mobility occurred at higher rates. White students were also more likely to move out-of-state after college graduation than Black (Kodrzychi 2001; Parsad and Gray 2005) or Latinx students (Ishitani 2011). Students from the highest family income quartile and with higher educated parents were also more likely to leave their home state (Ishitani 2011). Race and class may be compounding factors that limit residential movement (Foulkes and Schafft 2010). Additionally, racially marginalized people tend to have tighter family networks that decrease mobility (Spring et al. 2017).

The influence of social identities on migration patterns are potentially complicated by the divergent educational pathways that individuals take on their way to adulthood. We see different outcomes for those without a college degree: individuals with lower levels of education, lower income, and women were more likely to have *unintended* mobility, where high frequency moves occur due to shortages of affordable housing and poverty-related stressors (Schafft 2005; Spring et al. 2017). Because education levels and income are

typically related, these findings make sense in that these individuals are more likely to experience job loss, income instability, and must move to find access to affordable housing.

Place—There is strong evidence to suggest that place matters for access to services and opportunities and may play a determining factor in educational outcomes (Parker et al. 2005). Studies of urban communities have shown that the structural characteristics of neighborhoods (e.g., poverty level, racial proportion, population density), knowing neighbors, being involved in the community, and having social networks increase the positive value of a neighborhood and individual outcomes (Bolan 1997; Clark 2017; Fiore et al. 2015; Niewenhuis and Hooimeijer 2016). The ability to link family and friends within the same community creates an attachment to place and has influenced decisions to move far away (lack of attachment), move close by, or not at all (Clark 2017; Spring et al. 2017). Further, place or neighborhood attachment is both attitudinal and behavioral, where attitudinal attachment refers to an individual's emotional sentiment and satisfaction with their environment and behavioral attachment which reflects social ties and involvement within their community. These forms of attachment are strengthened (or weakened) by distance between origin and destination (in this case between home location and college campus) and that increased familiarity and exposure to home neighborhood results in stronger emotional ties (Bolan 1997).

Educational Pathways—In addition to how distances between home location and college campus influence place attachment, research has shown students who live closer to a postsecondary institution are more likely to attend college (Dache Gerbino 2018; González Canché 2018; Hillman 2016). Other postsecondary institutional characteristics (e.g., control, selectivity, size) also impact college choice (Nora 2004; Perna et al. 2005). Although these college factors have been examined in decisions regarding college choice, very little research explores how attending different institutions might impact post-graduation mobility. Groen (2004) utilized the National Longitudinal Study of the High School Class of 1972 to investigate the relationship between college attendance and working in the same state. He found that students who graduated from public universities were more likely to remain in the same state than those from private universities. Using the National Educational Longitudinal Study of 1988, Ishitani (2011) examined how institutional control, type, and selectivity influenced mobility. There was no significant difference among graduates of public and private institutions. However, students who graduated from selective or highly selective institutions were 56% and 161% more likely to leave the state when compared to graduates of non-selective institutions respectively. Warner and Sharp (2019), using nearly 30 years of data from the 1979 National Longitudinal Survey of Youth, found that college graduates were less likely to have changes in long-term mobility than respondents who lacked a college degree. Interestingly, after considering other life events (e.g., marriage, parenthood, unemployment), there was only a very small, non-significant effect of moving amongst college completers. This finding indicates that graduating from college has a long-term stabilizing effect irrespective of other life events.

Factors Related to Rural Migration

Existing research has found rural economies play an influential role in shaping the educational and career aspirations of the youth living in those communities. In some rural areas, the valuing of education is related to skills that can be learned for work in the local economy, and often, this means that technical skills replace formal postsecondary schooling (Howley and Howley 2010; Morris 2012). In other rural areas, despite a desire to remain close to family and friends, concerns regarding the lack of career opportunities for those with college degrees are prevalent (Ardoin 2013; Brooks et al. 2010; Bryan and Simmons 2009). Geographic location, distance (Dache-Gerbino 2018; Hillman 2016), academic performance, and school and community attachment (Petrin et al. 2014) have also impacted educational and career aspirations. Although we are beginning to understand the factors important to rural youth making college choice decisions, we have considerably less information regarding how those same experiences and school and community context during adolescence impact the likelihood of returning to rural areas after attending a college not near home.

Two international studies tested the relationship between returning to rural home regions and gender, parental education, and socioeconomic status. College graduates who had parents with lower education levels (Haley 2018; Rérat 2014) and from lower socioeconomic statuses (Haley 2018) were more likely to return home and there was no significant difference between men and women returning to rural home regions (Rérat 2014). Positive ties to home, family, friends, and community members seem to have great impact on rural return mobility or aspirations to return to their home communities (Gibbs 1995; Petrin et al. 2014). Rural youth who build stronger social ties, feel valued, and experience a sense of belonging are less likely to want to leave or more likely to return (Barcus and Brunn, 2009; McLaughlin et al., 2014; Ulrich-Schad et al., 2013; Wolfe et al., 2020).

Similar to demographic characteristics and positive social ties, the college context also appears to influence rural mobility. Graduates who studied at older, prestigious universities were the least likely to return home of all institutional types (Haley, 2018; Rérat, 2014). Haley attributed this finding to an internalization of prestige by attending the institution, which in turn influenced their sense of place within society – relating this prestige to their confidence and ability to find a highly competitive job located in urban markets. In terms of major, Estes et al. (2016) analyzed zip code data from the University of Arkansas and found that less than half of the students originally from rural areas returned to a rural area six to seven years after graduation, and a majority of those that returned to rural areas were within 50 miles of their original homes. Graduates who had majors in agriculture, engineering, or food sciences were more likely to return to their rural communities. Haley (2018) had similar findings: men who had degrees in forestry/agriculture and women with degrees in education were more likely to return to their rural homes than any other major, largely due to the local labor market where job opportunities in these fields were readily available. Findings also suggested that individuals who studied in a field atypical for their gender were less likely to return to rural areas – where women in forestry/agriculture were less likely than men to return home and men in education were less likely to return home than women.

Several previous studies have examined the role of labor markets in rural student and graduate decision-making and have shown that economic opportunities – regarding the potential for high earnings, job availability, cost of living, and rapid job growth - were associated with the likelihood of returning to a rural area (Fiore et al., 2015; Gibbs, 1995; von Reichert et al., 2014b; Wolfe et al., 2020). Von Reichert et al. found that employment options varied based on education level: those with bachelor's degrees were more likely to return and get a job in their field or start a new career compared to those with advanced or professional degrees. Similarly, the perceptions of the lack of local employment opportunities played a role in non-rural residential aspirations of 5,647 rural high school students (Petrin et al., 2014).

Rural return migration results from complex combinations of social identities, neighborhood attachment, community and higher education contexts, and economic opportunities. That so few studies have yet to be conducted that incorporate all of these drivers experienced during adolescence – a time when residential familiarization and socialization takes shape – speak directly to the significance and importance of our study.

Conceptual Framework

Sociologists, anthropologists, economists, and social geographers have used a variety of theories to address the illusiveness of return migration. Most theories use an international lens and examine migration patterns between countries; however, we use these theories to understand return migration within the United States, as the existing literature has shown residential migration, even among counties, is complex. Cassarino (2004) reviewed the evolution of return migration theories and classified them into five areas: neoclassical economics, the new economies of labor migration (NELM), structural return migration, transnationalism, and social network theory.

Cassarino's (2004) model considers that individuals are only interested in maximizing their financial resources and may not return home because it is not an economically rational decision (neoclassical economics). The neoclassical argument is well represented in the literature and our study includes socioeconomic status to account for this perspective. This conceptual model also includes the new economies of labor perspective - that individuals have always planned to return home after acquiring a specific resource (i.e., a college degree). This perspective drives our participant selection in that our sample includes adolescents who leave and then return with a resource. We account for the NELM framework by including individual characteristics (model 1) and college characteristics (model 4) in our analytical models. Cassarino also explains that both the neoclassical and NELM approaches are limited because they do not make any reference to social, political, or economic contexts of a migrant's home community. Therefore, Cassarino includes the structural approach to return migration which accounts for the socioeconomic and institutional factors of the home community that impact how the resources gained can be utilized within these communities. In this study, we measure structural return migration via the school structure (model 2) and neighborhood characteristics (model 3). Transnationalism is not represented in this study, as we do not have data on return visits to home communities nor the ability of the individual to continuously transfer resources

between areas. Finally, Cassarino's model includes social network theory, which suggests that an individual's relationships and ties within social structures are a significant influence in whether they return home, more so than personal skills and motivation. The familial, school, and neighborhood attachment variables (model 1) depict social network theory.

For this study, we are using a regional adaptation of Cassarino's (2004) conceptual approach to return migration, as it incorporates components of the above theories. In this framework, individuals gain tangible and intangible resources (financial capital, college degrees, networks, experiences) when they are away while holding onto the resources they had originally from home (social capital). At the same time, they continuously gather information regarding the local conditions and power structures to determine if they are able to use the resources they have gained if they were to return home, based on their previous experiences within their home communities. These factors influence the individuals' level of preparedness for return mobility.

Methodology

Data for this study come from the National Longitudinal Study of Adolescent to Adult Health (Add Health) contractual dataset (Harris, 2009) which tracks the health and behavior of youth in grades 7-12 in 1994-95 through adulthood ages 34-43 in 2016-18. Wave I (1994-95), Wave III (2001-02), and Wave V (2016-18) were utilized for this analysis. Wave I data include student and family background variables and school-level and community-level characteristics. Wave III variables consisted of postsecondary institutional-level characteristics. Wave V data were used to determine postsecondary educational attainment and current residential location of respondents. Additional information about Add Health's design can be found at http://www.cpc.unc.edu/projects/addhealth/design.

This dataset is appropriate for our analysis because it contains detailed information on personal, familial, school context, and neighborhood characteristics during the times students are making decisions about their future education. Gathering information on the type of postsecondary institution a student attends also adds to our understanding of how this new context influences migration decisions. Additionally, Wave V data were gathered when respondents were between ages 34 and 43, a period in the life cycle when there is lower residential mobility compared to the early to mid-30s (Spring et al., 2017; Warner and Sharp 2016). This is important for our understanding because the residential stability of college graduates, particularly in rural areas, can contribute long-term to human capital investments regarding education and labor market opportunities. This age period also garners less research attention, as recent migration literature has focused primarily on either young or retired adults (see von Reichert et al. 2014a).

Sample

Our initial sample includes participants who, at Wave V, earned at least a bachelor's degree or higher and had non-missing location data in Waves I and V ($n = 4,513$). Respondents had to be matched with Wave I data, at Wave III had to live at least 50 miles away from their Wave I location and were currently enrolled in a postsecondary institution, and also had to have a rural home location (URBAN = 0) in the contextual file or attend a rural

school (METRO = 3) within the school information data file at Wave I. We used 50 miles as the cutoff of a rural commuting zone (Hillman 2016). Home locations were considered urban if the block group had all individuals living inside urbanized areas based on the 1990 Census. The U.S. Census Bureau (1990) defined an urbanized area as "comprising one or more places ("central place") and the adjacent densely settled surrounding territory ("urban fringe") that together have a minimum of 50,000 persons." Any block group that did not fit this description was given a value of 0 for URBAN and categorized as rural. In reference to school urbanicity, rural was defined based on National Center for Education Statistics' locale codes: (1) a place not within a consolidated metropolitan statistical area (CMSA) or metropolitan statistical area (MSA) and designated as rural or (2) place within a CMSA or MSA designated as rural. Therefore, our analytic sample consisted of 496 respondents from Wave I through V.

Measures

Our dependent variable is based on the respondents' location at Wave V. For both research questions, we use a grouping file that is longitudinally consistent across all waves which allows us to compare Wave I with Wave V geocoded locations, distances, and locale codes based on 2010 Census geographic boundaries – specifically Census block group FIPS codes. The dependent variable was the graduate's degree of return, classified as return to the same census tract (4), same county (3), same state (2), or different state (1). FIPS codes are 12 characters in length. To determine whether participants returned to the same census tract, the first 11 characters should be the same. For counties, it is the first five characters, and the first two characters for states.

The independent variables of interest include Wave I student demographic characteristics (i.e., gender, race/ethnicity, socioeconomic status, mother's education level, region) and measures of family attachment, school satisfaction, and neighborhood attachment. Based on previous literature and our conceptual framework, these individual characteristics (NELM framework) and attachment (social network theory) have contributed to return migration. We used Belsky, Domingue, and Harris' (2018) construction of socioeconomic status (SES). In terms of the family, school, and neighborhood attachment, we relied on Resnick et al.'s (1997) developed measures of parent-family connectedness and school connectedness and Paunesku et al.'s (2008) approach to neighborhood attachment items (see Appendix A for family, school, and neighborhood attachment items).

We also included K-12 school characteristics (i.e., racial school segregation and school size) where racial school segregation was measured using the Black-White dissimilarity index. This index "measures the evenness with which black and white students are distributed across schools in the district" (Johnson 2020, p. 2). The higher the value, the higher the level of segregation. Community contextual variables were also collected: total reported crimes per 100,000 (logged), distance from an urban center (in km), population density, dispersion in race composition, median age, proportion of population age 16-19 enrolled in school, college-educated level for people over age 25, proportion of persons below poverty level, proportion voting Republican in 1992 presidential election, and proportion of and per capita local government direct expenditures for education (logged). The level of racial dispersion

ranges from 0 to 1 where a value of 0 is homogeneity of one racial group and 1 is where all racial category frequencies are equal (Billy, Wenzlow, and Grady 1998). We recoded the proportion of the college-educated population into three categories: low, average, and high. We assigned "average" based on the mean and one standard deviation from the mean. "Low" was given for communities further than one standard deviation below the mean and "high" for communities further than one standard deviation above the mean. This selection of variables was informed by the structural approach to return migration within our conceptual framework.

From the Wave III data files, we considered the selectivity and institution type the respondent was currently attending and the distance (in km) between Wave I and III locations. We used Wave III because all participants would have been between 20 and 25 years old and was before the Great Recession began (when Wave IV data were collected) – which contributed to varying levels of college enrollment (Long 2014). Considering rural students' college choice decisions tend to be shaped by distance to postsecondary institutions, as well as some evidence indicating distance influences whether a college graduate returns home, we included this in our model. Institutional selectivity was also examined, as we were interested in seeing how these factors could contribute to students' information gain, new behaviors, and perceived prestige associated with the type of college attended. Descriptive statistics are included in Tables 1 and 2 by mobility categories.

Data Analysis

All analyses and study design elements were run in R using the *survey* package (Lumley 2020). The Add Health study design used a clustered sample where clusters (schools) were not sampled with equal probability, suggesting observations are no longer independent and identically distributed (Chen and Harris 2020). To analyze the data, we used GSW5 as the sampling weight (as our outcome variable was based on a Wave V outcome of Wave I respondents), "with replacement" as the design type, PSUSCID as the cluster identifier, and REGION as the post-stratification adjustment. Because we were only interested in a subset of the entire Add Health data (bachelor's degree or higher recipients at Wave V, at least 50 miles away from Wave I location at Wave III, and from a rural area at Wave I), we used the subpopulation option to account for the complex sampling plan. Although Add Health is a nationally representative sample of adolescents, it is important to note that this may not be representative of all *rural* adolescents, as the study was not designed to answer this specific question. However, given our variables of interest and the longitudinal nature, this dataset is the best available.

We employed ordinal logistic regression for residential mobility through five models. Missing data were handled through listwise deletion. The first model examined individual-level demographic characteristics and measures of attachment, the second model focused on school-level structural factors, the third, community-level contextual items, the fourth considered the college context, and the fifth combined all items of the previous four models. Because our research question focused on rural school and community contextual factors, we wanted to first individually examine the relationship of contextual factors to return mobility and then determine the strength of these factors by combining these contexts with

demographic characteristics and attachment measures in the fifth model. It is important to note the svyolr() function in R uses proportional odds logistic regression, which includes the cumulative probability that the ordinal outcome Y is less than or equal to a specific category. Therefore, the model also estimates the three intercepts (sometimes called cut-points) to indicate where the latent variable was cut to make the groups observed in our data. These are normally not used to interpret results, but are included in the table. For ease of readability, "home" refers to the same census tract (population is typically between 1,200 and 8,000 with the spatial size varying depending on population density; U.S. Census Bureau, 2019).

Findings

From the ordinal logistic regression (Table 3, model 1), the statistically significant factors related to whether college graduates return to their rural home communities, in terms of demographic characteristics and attachment, included identifying as Black/African American ($p < 0.05$), socioeconomic status ($p < 0.001$) and level of school attachment ($p < 0.05$). When compared to white participants, Black/African American participants were 65% less likely to return home. The SES measure appeared to push college graduates away from home: with every one unit increase in SES, participants were 29% less likely to return home. With the school attachment measure, for every one unit increase in school connectedness, college graduates were 66% more likely to return home.

Model 2, which centers school structure, showed there was no evidence that average racial segregation was significant. School size was statistically significant ($p < 0.01$), where students who attended a high school between 351 and 775 students or over 776 students were 74% or 69% less likely to return home than students who attended schools with less than 125 students, respectively. There was no evidence to show that most of the neighborhood factors measured at Wave I were significant in pulling college graduates home (model 3). The only significant covariate was the level of college-educated population. Rural college graduates who lived in a neighborhood with a high level of college-educated adults (more than 31.35%) were 75% ($p < 0.05$) less likely to return home than those who lived in a low level of college-educated adults (less than 10.18%). Our college model (model 4) did not show that any college-related variables were significant. Our finding may be due to the small sample size of those who attended nonselective institutions (0.39%) in comparison to selective (70.33%) or highly selective institutions (16.90%).

In the combined model (model 5), SES remained statistically significant and in the same direction as in the first model, indicating with every one unit increase in SES, rural college graduates were 25% less likely to return home ($p < 0.001$). Women were 64% more likely to return home than men ($p < 0.05$). The level of school attachment also remained statistically significant, at the $p < 0.05$ level, where with every one unit increase in school attachment, rural college graduates were 60% more likely to return home. The proportion of college-educated residents during adolescence was also statistically significant – rural college graduates who were from an average or highly college-educated community were 69% ($p < 0.05$) and 85% ($p < 0.01$) less likely to return home than those from a low college-educated community. Population density during adolescence also became statistically significant at

the p < 0.05 level, where with every one unit increase in density, rural graduates were 49% less likely to return home.

Limitations

Our study is not without limitations worthy of discussion. First, we accounted for neighborhood effects in Wave I using data at the census tract level when available, and otherwise used county-level data. While census tracts spatially represent neighborhoods, they may not socially represent them, as neighborhoods are individually socially conceptualized. Therefore, we attempted to assess environmental effects in multiple ways by including school contexts (since adolescents' social exposure occurs more frequently in schools) and ties to home, measured by family, school, and neighborhood attachment scales. Second, our use of Wave III college characteristic variables did not necessarily indicate this was the first institution attended, the college our respondents graduated from, nor whether the participants were in school for their bachelor's, master's, doctoral or professional degrees (ages at Wave III would have been between 20 and 25). Subsequent investigations utilizing other nationally-representative datasets could isolate college characteristics based on whether it was the first institution or the bachelor's degree granting institution. Third, our sample only considered respondents who earned at least a bachelor's degree by Wave V, as well as more advanced degrees. Therefore, these differences in education level could influence the trajectory to return home. Although our research design intentionally excluded life course events or factors that could influence return migration experienced during adulthood, it is important to acknowledge the role advanced degrees can play in the likelihood of returning home (von Reichert, Cromartie, and Arthun 2014b). Fourth, we recognize different types of rural places can have varying impacts on rural migration (see Cromartie et al. 2015; Golding and Winkler 2020). The Add Health dataset does not delineate to rural typologies, such as the Economic Research Service's county typology codes, so we were unable to account for those differences in our analysis. The effects of these different economic and social characteristics of rural counties merit further study. Finally, we identified participants from a rural area at Wave I, but do not currently have data to allow us to identify whether that area at Wave V would still be categorized as rural. Wave V contextual data, when released, will allow for more nuanced future analyses. Despite these limitations, our study offers an increased understanding of how residential socialization during adolescence, "the places of the living memory" (Rérat 2014:125), impact rural return mobility amongst 34-43-year-old college degree holders.

Discussion and Conclusion

In contrast to much of the literature that examines rural "brain drain" and the short term returns to college education and migration patterns immediately post-college, we highlight the extent to which characteristics of rural schools and communities are associated with the pull to return home in the long-term - within census tracts, counties, and states - rather than focusing on factors that push academically talented students out in the short term. We examined the specific characteristics of a variety of rural places, complicating the narratives about rural youth who leave for college and their subsequent long-term migration up to 20 years post-college. Rural college graduates were pulled home by adolescent school

attachment, demonstrating the lasting value of supportive adolescent relationships within rural communities. Controlling for a variety of individual and contextual factors, we found that for rural youth who left their communities and obtained a bachelor's degree, long-term return migration was related to place characteristics as well as social identities such as gender and socio-economic status.

Persisting across a span of 20 years, adolescents' affective attachment to schools played a salient role in return migration decision-making. Rural college graduates who reported higher levels of school attachment during adolescence were more likely to return home, which underscores the long-term importance of local community investment in public education and belongingness. This measure remained significant after controlling for socioeconomic status and neighborhood effects, indicating the value of strong and supportive relationships in adolescence.

Similarly, by focusing on rural adolescents who went away to college and their longer-term rural return, our study complicates previous empirical evidence that has focused mostly on short-term associations between college degree achievement and return mobility for rural students. The college characteristics we tested (distance from home and institution type) were not significant, conflicting with literature that suggested that greater home-to-college distances discouraged a return for rural graduates (Gibbs 1995) and that higher levels of institutional selectivity were related to lower likelihood of rural college graduates returning home (Haley 2018). Both of these studies examined return migration of *recent* college graduates whereas in our study college graduates were further along the life course. The length of time away has been shown to have contrasting outcomes on the likelihood of returning: in one case, weakened social ties discourages a return (Halfacree and Rivera 2011), and in the other case, a return in the middle of the professional life - after achieving social mobility within a career (Findlay et al. 2009). The fact that few studies have examined the role of time, college context, and adolescent experiences for rural graduates' return migration warrants further investigation into patterns of educational attainment and rural return mobility.

For example, while college characteristics may not have been significantly related to odds of returning home in this study, 70% of our sample of rural participants attended a selective institution that was, on average, 749 kilometers (~465 miles) away from their home location, underlining the importance of looking at specific rural places. Students coming from highly educated rural communities, attending selective institutions, and not returning to their rural home is in stark contrast to how rural communities experiencing brain drain have traditionally been described (i.e., students being pushed out of "failing" rural communities citing lack of employment opportunities for a college-educated workforce).

In addition to schooling experiences, characteristics of the rural places themselves as youth experienced them during adolescence remained salient for the long-term return of rural college graduates. We found that population density serves as a significant force linked to college graduates' return to their home communities. As population density got higher, rural college graduates were less likely to return home. Perhaps a lower population density describes more of a "small-town life" – returners could have more opportunities to volunteer

or be a leader within the community – where they participate in tight-knit social networks that are characteristic of small towns, aligning with Cassarino's (2004) description of social network theory. Additionally, people from rural areas have been described as having an appreciation for land and open spaces (Cromartie, von Reichert, and Arthun 2015). Fewer people spread out further may be an attractive feature in the decision to return home.

We also found that rural college graduates who lived in communities with higher levels of college-educated adults were associated with a lower likelihood of returning home. There are several potential explanations for these results which should be examined in future research. First, the college-educated variable includes associate's, bachelor's, and advanced degrees. The differences in these proportions can have varying impacts on return mobility. Through the lens of neoclassical economics (Cassarino 2004), if a community leans heavily on technical associate's degrees because of the employment sector, students may not believe it to be economically rational to move to a place with no labor market for a PhD in History. Second, we measured "return home" as a return to the same census tract. Results may be different had we measured a return home at the county-level, but because we were interested in the immediate surrounding environment (i.e., neighborhood-level characteristics), we tried to focus on the most local level of analysis. Third, perhaps in communities with a lower proportion of college-educated residents, youth are encouraged to return home as they could potentially be significant contributors to community development. In this case, youth may have always planned a return home after earning a college credential which can be associated with Cassarino's (2004) new economies of labor perspective.

Study participants' social identities – gender and SES – were also associated with college graduates' likelihood of returning to their home communities. Women being more likely than men to return to their rural homes aligns with existing research that suggests women are more likely to return home to fulfill caretaking roles, especially as family members get older (Gibbs 1995). Additionally, this could indicate a change in the local labor markets of rural communities – where there is a decline in the availability of traditional-male jobs like agriculture or manufacturing (Corbett 2005; Haley 2018; Shepard 2014). Unsurprisingly, a higher socioeconomic status was associated with a higher likelihood of not returning home. This finding aligns with Ishitani's (2011) study which showed that college graduates who came from the highest family income quartile were more likely to leave their home state than any other income quartile as well as the traditional neoclassical economics argument – that it may not be economically rational for college graduates from the highest social class to return home. Further research is needed to explore the relationship between program of study, degree earned, and home labor markets, and how this may be complicated by gender roles in employment and caregiving.

Given these results, we offer several implications for policy and practice. In communities with unequal return mobility proportions by gender, community leaders should take an inventory of local employment opportunities and what expectations for these positions are communicated to youth. Providing greater acknowledgement, or greater support, for students' career intentions could help youth feel more connected and accepted in their home communities. Additionally, because youth from higher socioeconomic status families are less likely to return home, it is also important for communities to address some of the

potential economic barriers to returning by providing financial incentives for new local businesses. Not only may this help attract previous residents to return, but it can also help in the long-term by providing school-aged children the opportunity to experience a thriving community, which may also promote return migration.

The existing explanations offered for why college educated people do not return to their rural home communities are largely based on factors directly following college graduation. Our study, in contrast, analyzed return mobility of older, college educated adults based on their environments and contexts during adolescent development. Because all of the participants in this study attended college away from home, they were potentially more likely to experience intervening opportunities keeping them from home. Yet, rural college graduates who had higher levels of school attachment, lived in a community with a lower population density, and had fewer college-educated community members had higher odds of returning home. Further work is needed to determine the strength of these factors when considering other life events that occur from ages 34-43, such as marriage, parenthood, divorce, taking care of older family members, and unemployment. In conclusion, our study provides a nuanced picture of rural return mobility and our results push traditional conceptualizations of rural communities and mobility to consider how adolescent experiences and the contexts in which they developed influence long-term rural brain gain.

Acknowledgements:

Appendix A. Measures for Attachment

Family Attachment

1 = not at all; 2 = very little; 3 = somewhat; 4 = quite a bit; 5 = very much

How close do you feel to your mother?

How much do you think she cares about you?

How close do you feel to your father?

How much do you think he cares about you?

(Reverse coded) 1= strongly disagree; 2 = disagree; 3 = neither; 4 = agree; 5 = strongly agree

Most of the time, your mother is warm and loving toward you

Overall, you are satisfied with your relationship with your mother

Most of the time, your father is warm and loving toward you

Overall, you are satisfied with your relationship with your father

School Attachment

(Reverse coded) 1= strongly disagree; 2 = disagree; 3 = neither; 4 = agree; 5 = strongly agree

You feel close to people at your school

You feel like you are part of your school

You are happy to be at your school

The teachers at your school treated students fairly

You feel safe in your school

1 = not at all; 2 = very little; 3 = somewhat; 4 = quite a bit; 5 = very much

How much do you feel that your teachers care about you?

Neighborhood Attachment

0 = false; 1 = true

You know most of the people in your neighborhood

People in this neighborhood look out for each other

In the past month, you've stopped on the street to talk with someone who lives in your neighborhood

0 = no; 1 = yes

Do you usually feel safe in your neighborhood?

1 = not at all; 2 = very little; 3 = somewhat; 4 = quite a bit; 5 = very much

On the whole, how happy are you with living in your neighborhood?

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Table 1

Weighted Descriptive Statistics of Add Health Respondents by Mobility (Frequencies at Wave 1) n = 496

Variable	%	Mobility (%)			
		Same Tract	Same County	Same State	Out of State
Sex					
Female	59.43	18.70	24.78	35.65	20.87
Male *	40.57	17.83	20.38	38.85	22.93
Race/Ethnicity					
Black	17.24	20.00	17.78	33.33	28.89
Hispanic	5.36	21.43	28.57	21.43	28.57
White *	70.11	17.49	22.95	38.80	20.77
Other Single Race	3.45	33.33	22.22	22.22	22.22
Multiracial	3.83	5.00	25.00	35.00	35.00
Mother's Highest Education					
Less than High School *	2.04	12.50	37.50	25.00	25.00
High School	19.34	16.44	27.40	34.25	21.92
Vocation/Technical Program	5.09	5.00	20.00	50.00	25.00
Some College	11.20	25.00	18.18	25.00	31.82
Bachelor's or Above	59.29	17.60	21.89	39.06	21.46
Unsure	3.05	25.00	16.67	41.67	16.67
Region					
West *	13.98	16.44	23.29	31.51	28.77
Midwest	26.44	12.32	28.26	38.41	21.01
South	49.62	23.17	17.76	36.68	22.39
Northeast	9.96	11.54	28.85	34.62	25.00
High School Size					
At most 125 *	1.41	57.14	14.29	14.29	14.29
126-350	10.69	35.85	9.43	39.62	15.09
351-775	31.65	21.66	17.83	37.58	22.93
At least 776	56.25	12.90	29.03	35.48	22.58
College-Educated Level					
Low *	11.09	42.37	11.86	35.59	10.17
Average	75.60	17.09	23.98	35.46	23.47
High	13.31	4.29	21.43	41.43	32.86
College Selectivity					
Nonselective *	0.39	50.00	0.00	50.00	0.00
Selective	70.33	17.88	21.23	36.87	24.02
Highly Selective	16.90	18.60	23.26	32.56	25.58
Elite	12.38	17.46	23.81	39.68	19.05

Note:

*
Reference Group

Table 2

Weighted Descriptive Statistics of Add Health Respondents (Means at Waves 1) n = 496

Variable	Mean	S.D.	Min	Max
Socioeconomic status measure	0.18	0.08	−5.03	2.73
Family Attachment	4.27	0.03	0.00	5.00
School Attachment	3.94	0.03	0.00	5.00
Neighborhood Attachment	3.15	0.06	0.00	4.00
Average racial segregation: black-white dissimilar	0.24	0.02	0.00	0.64
Reported crimes/100,000 by county	4494.00	291.89	108.00	9992.00
Distance from urban area (km)	27.58	4.69	0.00	164.99
Distance between Wave I and III locations	768.63	60.65	80.22	8005.70
Density (persons/sq km)	0.21	0.04	0.00	3.30
Dispersion in race composition	0.19	0.02	0.00	0.81
Median Age	32.22	0.30	0.00	44.24
Proportion aged 16-19 enrolled in school	0.79	0.01	0.00	1.00
Proportion of persons below poverty level	0.14	0.01	0.00	0.55
Proportion voting republican in 1992 presidential election	0.39	0.01	0.24	0.59
Proportion of local government general expenditures for education	0.52	0.02	0.00	0.80
Per capita local government general expenditures on education	678.98	22.01	0.00	2281.68

Table 3

Weighted Ordinal Logistic Regression Analyses of the Relationship Between Return Mobility and Rural College Graduates

Variable	Model 1: Individual			Model 2: School			Model 3: Neighborhood			Model 4: College			Model 5: Combined		
	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio
Mobility (dependent variable)															
Out of state ∣ Same state	−0.28	1.18		−2.30	0.47		−4.55	2.53		−1.95	1.27				
Same state ∣ Same county	1.54	1.19		−0.62	0.46		−2.83	2.52		−0.25	1.26				
Same county ∣ Same tract	2.65	1.19		0.48	0.46		−1.72	2.48		0.79	1.32				
Sex	0.26	0.27	1.29										0.50	0.30	1.64 *
Race/Ethnicity															
Black	−1.04	0.49	0.35 *										−0.50	0.59	0.61
Hispanic	−0.43	0.58	0.65										−0.18	0.53	0.83
Other Single Race	−0.36	0.86	0.70										−0.40	0.90	0.67
Multiracial	0.48	1.06	1.62										0.31	0.75	1.36
Mother's Highest Education															
High School	0.10	1.09	1.11										1.08	1.04	2.96
Vocational/Technical	−0.05	1.07	0.96										0.65	1.05	1.91
Some College	−0.32	1.14	0.73										0.25	1.00	1.28
Bachelor's or Above	0.06	1.07	1.06										0.43	0.97	1.54
Unsure	0.73	1.29	2.07										1.58	1.24	4.85
Socioeconomic status measure	−0.34	0.10	0.71 ***										−0.29	0.11	0.75 **
Region															
Midwest	−0.37	0.45	0.69										−0.49	0.57	0.61
South	0.23	0.38	1.25										0.02	0.74	1.02
Northeast	0.58	0.34	1.78										0.71	0.52	2.03
Family Attachment	−0.32	0.27	0.73										−0.02	0.26	0.98
School Attachment	0.51	0.27	1.66 *										0.47	0.33	1.60 *
Neighborhood Attachment	0.15	0.12	1.16										0.00	0.14	1.00
High School Size															
126-350				−0.33	0.57	0.72							−0.59	1.73	0.55

Variable	Model 1: Individual			Model 2: School			Model 3: Neighborhood			Model 4: College			Model 5: Combined		
	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio	β	SE	Odds Ratio
351-775				-1.36	0.47	0.26 **							-2.21	1.69	0.11
At least 776				-1.16	0.45	0.31 **							-1.69	1.63	0.19
Average racial segregation: black-white dissimilar				0.61	0.63	1.84							0.17	1.42	1.18
Total Reported Crimes/100,000 (logged)							-0.44	0.20	0.65				-0.26	0.28	0.77
Distance to Urban Center (km)							-0.01	0.00	0.99				0.00	0.01	1.00
Population Density							-0.29	0.19	0.75				-0.67	0.28	0.51 *
Dispersion in Race Composition							0.71	0.64	2.02				-0.65	1.30	0.52
Median Age							-0.03	0.03	0.97				0.00	0.05	1.00
Proportion aged 16-19 enrolled in school							1.84	1.55	6.31				0.57	2.06	1.77
Proportion persons below poverty level							0.48	1.36	1.62				-1.18	0.52	0.31 *
College-educated Level															
Average							-0.80	0.44	0.45				-1.87	0.70	0.15 **
High							-1.40	0.58	0.25 *				-1.13	2.02	0.32
Proportion voting republican in 1992 presidential election							0.65	1.45	1.91				-0.07	2.05	0.93
Proportion of local government general expenditures for education							-0.93	1.09	0.39				-1.31	1.99	0.27
Per capita local government general expenditures on education (logged)							-0.15	0.17	1.17				-0.06	0.36	0.94
Institutional Selectivity															
Selective										-0.70	1.25	0.50	0.90	1.11	2.46
Highly Selective										-0.31	1.33	0.74	1.69	1.31	5.41
Elite										-1.08	1.31	0.34	0.68	1.16	1.97
Distance from Wave I to III location (in km)										0.00	0.00	1.00			
	F value	df	p-value	F value	df	p-value	F value	df	p-value	F value	df	p-value	F value	df	p-value
Wald Test	2.95	17/57	0.0012 **	3.19	4/72	0.0181 *	1.71	12/64	0.0856	0.94	4/73	0.4445	6.09	37/35	0.0001 ***

Notes:

*
p<.05.

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**
p<.01.

***
p<.001.

Table 4.

Correlation Matrix of Quantitative Variables

	SES	FA	SA	NA	ARS	Crime	UAD	I/III Dist	Density	DRC	MA	% Sch	% Pov	% Rep	% Ed Exp.	Ed Exp
Socio-economic status (SES)	1	0.08	0	0.01	-0.04	0.07	-0.17	0.01	0.01	-0.19	0.15	0.11	-0.38	-0.03	-0.08	0.16
Family attachment(FA)	0.08	1	0.41	0.18	0.04	-0.06	-0.06	-0.03	0.04	0	0.04	0.05	0	0.09	0.03	0.03
School attachment(SA)	0	0.41	1	0.17	-0.02	-0.11	0	0.01	-0.04	0.03	0.01	0.03	-0.02	0.03	-0.02	-0.02
Neighborhood attachment(NA)	0.01	0.18	0.17	1	-0.05	-0.09	0.02	-0.14	-0.08	-0.01	0.01	0.06	0	0.08	0	0.04
Average racial segregation(ARS)	-0.04	0.04	-0.02	-0.05	1	0.25	0.06	-0.03	0.22	-0.04	-0.18	0.06	0.27	0.08	-0.01	-0.37
Crime	0.07	-0.06	-0.11	-0.09	0.25	1	0.06	-0.01	0.17	0.39	-0.01	0.21	0.23	-0.08	-0.1	-0.04
Urban area distance (UAD)	-0.17	-0.06	0	0.02	0.06	0.06	1	-0.01	-0.12	0.28	0.06	0.15	0.34	0.04	-0.03	-0.41
WI and WIII distance	0.01	-0.03	0.01	-0.14	-0.03	-0.01	-0.01	1	0	0.04	-0.07	-0.03	-0.07	-0.06	-0.02	-0.01
Density	0.01	0.04	-0.04	-0.08	0.22	0.17	-0.12	0	1	-0.04	-0.15	-0.06	0.04	-0.17	-0.06	-0.03
Dispersion in race (DRC)	-0.19	0	0.03	-0.01	-0.04	0.39	0.28	0.04	-0.04	1	0.05	0.09	0.46	-0.08	0.03	-0.19
Median Age(MA)	0.15	0.04	0.01	0.01	-0.18	-0.01	0.06	-0.07	-0.15	0.05	1	0.23	-0.22	-0.2	0.03	0.04
% School	0.11	0.05	0.03	0.06	0.06	0.21	0.15	-0.03	-0.06	0.09	0.23	1	-0.02	-0.02	-0.03	-0.11
% below Poverty	-0.38	0	-0.02	0	0.27	0.23	0.34	-0.07	0.04	0.46	-0.22	-0.02	1	0.1	0.22	-0.21
% voting republican	-0.03	0.09	0.03	0.08	0.08	-0.08	0.04	-0.06	-0.17	-0.08	-0.2	-0.02	0.1	1	0.2	-0.21
% Ed Expenditures	-0.08	0.03	-0.02	0	-0.01	-0.1	-0.03	-0.02	-0.06	0.03	0.03	-0.03	0.22	0.2	1	0.37
Per capita Ed Expenditures	0.16	0.03	-0.02	0.04	-0.37	-0.04	-0.41	-0.01	-0.03	-0.19	0.04	-0.11	-0.21	0.02	0.37	1