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Assessment of Community Resilience in the U.S. Northern Border Region

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Abstract

In recent years, communities have faced heightened resilience challenges due to climate change, the COVID-19 pandemic, and economic stressors. How communities respond to such challenges is based on both the resilience of individuals and the community's capitals. We analyze how residents perceive their local community's resilience in twelve counties in five states across the Northern Border region using survey data from 678 people. We investigate five categories of community resilience: (a) economic, (b) environmental, (c) social, (d) public infrastructure, and (e) overall resilience. Further, we examine how demographic characteristics influence perceptions of community resilience across all five dimensions. Our findings reveal that personal identities are predictor variables for varying perceptions of resilience, with specific demographics perceiving higher community resilience in certain categories while others perceived lower resilience. In particular, higher levels of resilience are observed for people from higher income households, higher education, retirees, and men and women as compared to nonbinary individuals. The state of Vermont perceives higher levels of resilience across all categories when compared to the other states. These findings show the importance of inclusive community development planning and the need for cohesive efforts that equitably allocate resources. This research contributes to the broader understanding of resilience in rural communities and the pathways for improving resilience in different categories.

Keywords: Resilience, individual, collective, community, development

Évaluation de la résilience communautaire dans la région frontalière nord des États-Unis

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Résumé

Au cours des dernières années, les communautés ont dû faire face à des défis accrus en matière de résilience en raison du changement climatique, de la pandémie de COVID-19 et des difficultés économiques. La manière dont les collectivités réagissent à ces défis dépend à la fois de la résilience des individus et des atouts dont dispose la collectivité. Nous analysons la perception de la résilience de la communauté locale par les résidents de douze comtés répartis dans cinq états de la région frontalière du nord, à partir des données d'un sondage mené auprès de 678 personnes. Nous étudions cinq dimensions de la résilience communautaire : (a) économique, (b) environnementale, (c) sociale, (d) liée aux infrastructures publiques et (e) globale. Nous examinons également l'influence des caractéristiques démographiques sur la perception de la résilience communautaire selon ces cinq dimensions. Nos résultats révèlent que les identités personnelles influencent constituent des variables prédictives des différences de perception de la résilience: certains groupes démographiques perçoivent une résilience communautaire plus élevée dans certaines catégories, tandis que d'autres la perçoivent plus faible. On observe notamment une résilience plus élevée chez les personnes issues de ménages à revenus plus élevés, les personnes ayant un niveau d'éducation plus élevé, les retraités, ainsi que les hommes et les femmes, comparativement aux personnes non binaires. L'État du Vermont affiche une résilience plus élevée dans toutes les catégories que les autres États. Ces résultats soulignent l'importance d'une planification inclusive du développement communautaire et la nécessité d'efforts concertés pour une répartition équitable des ressources. Cette recherche contribue à une meilleure compréhension de la résilience dans les communautés rurales et des pistes d'amélioration de cette résilience selon différentes dimensions.

Mots-clés : Résilience, individuelle, collective, communautaire, développement

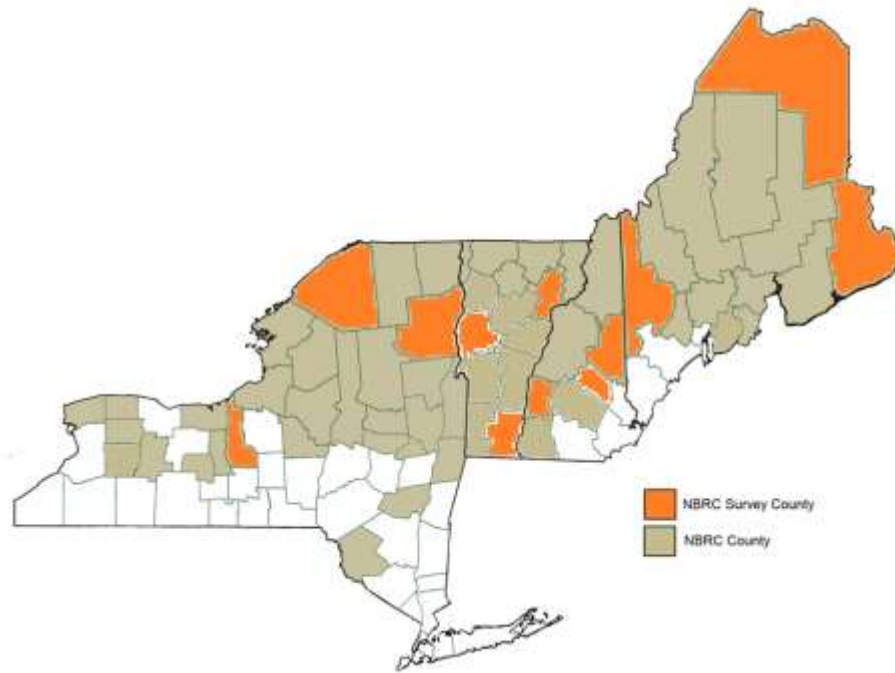
1.0 Introduction

In recent years, communities around the globe have encountered accelerated challenges to resilience in the face of climate change, the COVID-19 pandemic, and economic transitions. The term ‘resilience’ is used across disciplines to describe a system’s ability to positively adapt to shocks (Herrman et al., 2011), though there are varying definitions throughout the literature (Southwick et al., 2014). Magis (2010) defines community resilience as “the existence, development, and engagement of community resources by community members to thrive in an environment characterized by change, uncertainty, unpredictability, and surprise,” (p. 402). emphasizing that the resilience of community members is linked to the availability of resources. Revealing areas of weak and strong resilience within communities can potentially be identified through aggregating individual’s perceptions because the characteristic of a collective entity is based on sum of its individual’s characteristics (Kirman, 2010; Sen, 2017).

Our study area is the Northern Border region, a federally designated area along the Canadian border including counties in Maine, New Hampshire, Vermont, and New York (see Figure 1). This region was established by Congress in the 2008 Farm Bill. Since then, the Northern Border Regional Commission (NBRC), originally based on the Appalachian Regional Commission model, has been funded by Congress since 2010. Their mission is to “catalyze community vitality and economic prosperity in the northern border region with flexible funding and strategic support.” (NBRC, n.d. b). An historic stronghold of forest product manufacturing, the Northern Border region has experienced economic challenges due to changing timber markets, and its communities have higher levels of unemployment, population loss and are generally lower income than other parts of the Northeast (Daigneault et al., 2023). The region’s rich natural resources, however, attract second homeowners. Vacation homes make up over 20% of the housing stock in much of the Northern Border region (Yun et al., 2021), which disrupts the synergy of local municipalities and calls for an investigation of disparities. As this region is identified as a potential climate change refuge, the migration patterns are widening inequality and showcasing systemic issues in community development paradigms (Osterberg et al., 2023).

While community resilience is often discussed at the collective level, less quantitative work has examined how demographic identity shapes individual perceptions of resilience within rural communities. Understanding these differences is important because resilience planning and resource allocation are often informed by public participation and community feedback. This article begins with an overview of the literature on the relationship between individual and collective resilience, provides context to sampling, recruitment, and the area of study, explains the procedure of multivariate analysis, reports on research results, and considers implications, future areas of study, and the limitations of this model.

Figure 1. Map of the study region.



Source: Authors.

2.0 Literature Review

This study focuses on rural, economically distressed, and transitional counties in the Northern Border Region of the northeastern U.S. Under this federal-state framework, ‘distressed’ counties describe areas experiencing severe, persistent rates of poverty, unemployment, or outmigration, and ‘transitional’ designations refer to regions that have recently suffered economic disruption but are moving toward stability (NBRC, 2024). The Northern Border region has undergone continuous changes over the last decade. Natural resource industries—once the backbone of the regional economy—have either consolidated or been replaced (Hibbard & Lurie, 2013), political polarization has increased mistrust among community members (Jones, 2015), and climate change has increased the frequency and intensity of flooding events, putting pressure on community infrastructure (Mayo, 2022). Compared to urban regions, rural areas are more likely to face food insecurity (Coleman-Jensen, 2019), higher and increasing morbidity (Thomas et al., 2024) and higher levels of poverty (Toossi et al., 2021). This study contributes to a growing body of literature on pathways for increasing the resilience and well-being of rural communities amidst these changes.

2.1 Community Resilience

Community and resilience are two words that have their own sets of literature defining and detailing them. Carney et al. (2022) provides a comprehensive overview of the diverse perspectives of community, specifically identifying both geographic and ontological dimensions of community identity. In terms of this paper’s geographical definition of community, the focus is on the Northern Border Region and is detailed in Figure 1. In terms of ontological communities, this survey instrument defined several groups based on demographics, including (a) retirement status, (b) length of

residency, (c) education status, (d) income level, (e) permanent or seasonal residence, (f) age, (g) political affiliation, (h) renter or owner status, (i) parental status, and (j) gender. Typical household survey demographic data collection strategies utilize these socially constructed groups to ensure underrepresented populations are accurately accounted for in regional planning (Groves et al., 2011). Considering both place-based and identity-based dimensions of community provides a more comprehensive understanding of resilience across populations.

Resilience is an increasingly popular term, particularly in discussions surrounding how rural communities adapt to economic, environmental, and social stressors. Berkes and Ross (2013) suggest that planning for community resilience requires integrating a social-ecological systems approach with community strengths and agency, “with attention to people–place connections, values and beliefs, knowledge and learning, social networks, collaborative governance, economic diversification, infrastructure, leadership and outlook” (Berkes & Ross, 2013, p. 5). These frameworks emphasize that resilience emerges through interactions between social, economic, environmental, and institutional systems within communities. Rural communities are often forced to do more with fewer financial and institutional resources, making resilience especially important within economically transitional regions.

2.2 Factors that Influence Individual Resilience

Past research has found that demographic factors shape resident perceptions of resilience in their communities (Ignatiadis et al., 2021; Sherman & Daigneault, 2023). For example, research on Maine residents’ perceptions of community resilience found that residents with more “personal agency [i.e., higher income and education] tended to interpret their community at large as being more resilient” (Sherman & Daigneault, 2023, p. 225). Residents who viewed their communities as resilient also felt more strongly that their communities were taking the right steps toward future planning. In addition to income and education, political affiliation also emerged as a demographic factor shaping perceptions of community resilience. Residents aged 18–34 who identified as conservative were more likely to feel that Maine over-prioritized conserving natural resources and that the focus on conservation limited the economic benefits of resource-based industries like pulp and paper (Sherman & Daigneault, 2023).

A common theme across studies examining resilience and demographic factors is community participation. Low-income residents are less likely to participate in community decision-making (Bullard & Johnson, 2000) and less likely to vote (Fain & Dworkin, 1993). Low-income residents often lack the time and resources to take on additional responsibilities associated with community participation, and those who do participate frequently do not feel represented by decision-makers, making them less likely to participate in the future (Franko et al., 2016). A study by Einstein et al. (2019, p. 29) found that individuals who were “older, male, longtime residents, voters in local elections, and homeowners are significantly more likely to participate” in town meetings. Together, these findings suggest that residents with greater time, financial security, and institutional access are more likely to shape local planning and development processes. This phenomenon suggests that perceptions of resilience may vary systematically across demographic groups and that planning outcomes may disproportionately reflect the priorities of more civically engaged populations.

2.3 Individual Perceptions of Collective Resilience

Individual and collective resilience are interdependent and may mutually reinforce one another (Kirman, 2010; Sen, 2017). While collective resilience is often discussed in terms of physical infrastructure, governance capacity, or economic performance, it is also rooted in the relationships and social networks that bind community members together (Chriest & Niles, 2018). As a result, perceptions of resilience are shaped not only by material conditions but also by lived experiences, social trust, and access to community resources.

Because individual experiences and contributions are linked to collective perceptions of resilience (Smith & Johnson, 2020), understanding how residents perceive resilience can provide insight into broader community dynamics. Although perceptions of resilience may differ from objective indicators of economic or infrastructural capacity, perceptions remain important because they influence civic engagement, trust in institutions, and support for community planning initiatives. Empirical comparisons of individual and community resilience are still emerging within the literature, and there has been limited quantitative work examining how demographic identity shapes perceptions of resilience across multiple dimensions (Berkes & Ross, 2013; Magis, 2010; Payne et al., 2021).

This study contributes to the growing literature evaluating individual perceptions of resilience as indicators of broader community resilience. Specifically, we ask:

- Which demographic indicators are associated with higher perceived resilience?
- Which demographic indicators are associated with lower perceived?

We examine these questions across five categories of resilience: economic, environmental, social, public infrastructure, and overall resilience.

3.0 Materials and Methods

We investigate individual community member perceptions within each category to understand how resilience is perceived by different demographic segments of the population using survey data from 12 predominantly rural and distressed counties in the Northern Border region of the United States, a federally designated area along the Canadian border including counties in Maine, New Hampshire, Vermont, and New York. We examine the relationship between demographic characteristics and perceptions of community resilience to provide insights into the experiences of community resilience on the individual level and identify target populations for resilience improvements.

The Northern Border Region is largely rural, with a median population density of 75 people per square mile. (US Census Bureau, 2024). Rural communities like the Northern Border Region are moving away from resource-based economies (Hibbard & Lurie, 2013) and facing dilemmas as their economies develop. Common themes for these communities include increasing urban–rural migration (MacCallum et al., 2023), environmental factors (Abrash Walton et al., 2021), the Covid-19 pandemic (Golding, 2014; Nelson & Frost, 2022), and increasing political polarization (Mettler & Brown, 2022).

The NBRC is a federal-state partnership for economic and community development in the Northeast United States that defines distressed counties as those with “high rates of poverty, unemployment, or outmigration [and that] are the most severely

and persistently economically distressed and underdeveloped” (NBRC, 2023, p.4). The NBRC defines “transitional [counties as those] that have suffered high rates of poverty, unemployment, or outmigration [or] are economically distressed and underdeveloped” (NBRC, 2023, p.4).

3.1 Study Population

The target population for this study were residents of counties in Maine, New Hampshire, New York, Maine, and Vermont categorized as ‘distressed’ and ‘transitional’ by the NBRC. The study population is represented in Figure 1. The NBRC updates these designations each federal fiscal year to guide investment of funds (NBRC, n.d.a). Table 1 shows all counties within this five-state region labeled as ‘distressed’ and ‘transitional’ during FY 2021. In consultation with NBRC leadership, the project team selected three counties from each state to include in the analysis for a total of 12 counties. The selection process accounted for geographical and economic diversity, and targeted areas that have been less studied and/or received relatively less economic development aid in recent years. In total, three were transitional counties and nine were distressed counties.

Table 1. *Northern Border Regional Commission Distressed and Transitional Counties in FY 2021*

State	Counties
Maine	Androscoggin, Aroostook* , Franklin, Hancock, Kennebec, Knox, Oxford* , Penobscot, Piscataquis, Somerset, Waldo, and Washington* ,
New Hampshire	Belknap# , Carroll# , Cheshire, Coös, Grafton, and Sullivan*
New York	Cayuga* , Clinton, Essex* , Franklin, Fulton, Genesee, Greene, Hamilton, Herkimer, Jefferson, Lewis, Livingston, Madison, Montgomery, Niagara, Oneida, Orleans, Oswego, Rensselaer, Saratoga, Schenectady, Senesac, St. Lawrence* , Sullivan, Washington, Warren, Wayne, and Yates
Vermont	Addison# , Bennington, Caledonia* , Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orange, Orleans, Rutland, Washington, Windham* , Windsor

Note: Table 1 shows all counties included in the study population; the sampled counties are marked in bold, and symbols are used to indicate county status.

3.2 Sampling and Recruitment

This study was part of a multi-institution mixed-methods study assessing community resilience in the region. After obtaining Institutional Review Board approval from both the University of Vermont and the University of Maine, we recruited participants from the 12 selected counties through a postcard sent using the U.S. Postal Service’s Every Door Direct Mail (EDDM) program. EDDM allows customers to send one postcard to every household in a chosen zip code and has been demonstrated to be an effective method of study recruitment in rural areas (Al-

Muhanna et al., 2023). We used EDDM to send postcards to a random selection of 3,000 to 3,500 households in each county of interest, for a total of 40,000 postcards. The postcard provided a brief overview of the study and invited recipients to complete the survey online in Qualtrics through a listed URL, provided they were 18 years of age or older. The survey was open for 6 weeks. To incentivize participation, six survey respondents per state were randomly selected to receive a \$75 Visa gift card.

3.3 Instrument

Following Payne et al. (2021), this study breaks down resilience into quantitative measurements for specific components to develop an accurate understanding of community resilience. These measurements are organized by five categories: (a) social resilience, (b) economic resilience, (c) public infrastructure resilience, (d) environmental resilience, and (e) overall resilience. Social resilience is the extent to which residents engage with, trust, and respect their communities and one another (Putnam, 2001). Measures of high social resilience have been shown to improve both wellbeing (Helliwell et al., 2014) and response coordination (Aldrich, 2012) during times of natural disaster, community crisis, and transition. Economic resilience relates to the sustainability and growth of new business, economic diversity, entrepreneurship, and personal financial agency (McIntyre & Roy, 2023). Public infrastructure resilience, also referred to as ‘built resilience’ in the literature, describes a town’s ability to access and sustain funds to support well-being, such as drinking and wastewater, internet, healthcare, and childcare (Flora et al., 2018). Environmental resilience includes how the community’s perceptions of natural capital impact wellbeing, tourism, town viability, and protection from natural disasters (Flora et al., 2018). Overall resilience encapsulates all of the preceding categories and considers general perceptions of community resilience.

This research instrument is modeled after previous survey research on community resilience done by Sherman and Daigneault (2023), where survey questions were used to capture “views, values and opinions held by persons of various backgrounds in Maine” (p. 215). Sherman and Daigneault (2023) and this study both sought to understand connections between individual’s demographics and perceptions of resilience. This study’s survey retained questions related to social, economic, built, environmental, and overall resilience, though some questions were edited, removed, or added to apply to the broader regional scope.

For each dimension of resilience (social, economic, built, and environmental), participants were asked to rate their level of agreement with a series of statements on a 5-point Likert scale from “strongly disagree” to “strongly agree.” Participants also had the option to respond “n/a or don’t know.” The statements are listed in Table 2. We also asked participants to rate their town’s resilience in each category on a scale from 0–10, with 0 being “not at all resilient” and 10 being “very resilient. For example, for economic resilience, participants rated their agreement with 11 statements about the financial conditions and potential of their town, and then were asked to “please rate the economic resilience of your town” on the 0–10 scale. We provided a definition of resilience for each of these prompts. At the end of this section, we asked respondents to rate the overall perceived resilience of their town.

Table 2. *Individual Statements by Resilience Dimension*

Public Infrastructure Resilience

My town has the financial resources it needs to resolve town problems
People in my town are able to meet their basic needs
People in my town have the ability to solve their own problems
There is safe and affordable housing available in my town
My town has sufficient public drinking water infrastructure
My town has sufficient public wastewater infrastructure
My town has quality internet service
My town has sufficient access to health care services
People in my town have sufficient access to affordable childcare
People in my town can access healthy, fresh foods

Social Resilience

I generally trust people who live in my town
The leaders of my town are working hard to make positive change
There are places in my community where I can meet neighbours and make new connections
My town has a wide range of volunteer opportunities
Most residents in my town participate in community groups, clubs, churches, and other shared activities
My town has cultural events that engage local residents
Local organizations support the health and wellbeing of local residents
My town has effective community leaders
I trust how decisions are made in my town by elected leaders and local officials
People in my town trust public officials
My town's leaders act in the best interest of its people

Environmental Resilience

Conservation of natural areas is important to the future of my town
Conservation of working lands (e.g. farms) is important to the future of my town
People in my town have access to open spaces for recreation, wellness, and nature experiences
My town has sufficient natural resources
My town is well-prepared to respond to natural disasters
My town is taking actions to improve environmental stability

Economic Resilience

My town is positively contributing to the economy of the surrounding region
My town is economically diverse
My town is better off today than it was 20 years ago

Table 2 continued

My town will be better off 20 years from now compared to today

My town has the motivation to attract new businesses

The opinions of residents are valued when creating an economic plan for my town

People living in my town have the financial means to meet their essential needs

Outdoor recreation and tourism are important to the future of my town

Recreational opportunities associated with conservation lands will bring new people and jobs to my town

In the future, the economic importance of outdoor recreation and tourism will exceed that of the traditional farm and forestry sectors in the region

Land conservation is compatible with the farm and forestry sectors in my region

Overall Resilience

I am optimistic about the future of my town

I feel a sense of belonging to my town

I can rely on my neighbors in a time of crisis

I am proud to live in my town

To close, we collected demographic information about (a) location, (b) years lived in their town; (c) months per year spent in their town; (d) number of household members; (e) age, race, ethnicity, gender identity, political ideology, education, income, employment, food security status; and (f) whether they rent or own their home.

3.4 Analysis

We performed all quantitative analysis in Stata BE Version 17. The independent variables utilized in this analysis are shown in Table 3, which includes a variety of sociodemographic characteristics operationalized as binary and categorical variables. For certain binary variable with arbitrary cutoffs, such as residency and age, boundaries were determined using sample-based median splits (MacCullum et al., 2002). For categorical variables with arbitrary cutoffs, we determined group thresholds by aligning our sample categories with population distribution benchmarks for Vermont derived from US Census Bureau data. Specifically, education tiers were split to isolate post-baccalaureate credentials given the prevalence of the baseline degree, while income boundaries (\$50k–\$100k) were anchored to the Vermont median household income, which is \$81,203 in 2024 inflation-adjusted dollars (US Census Bureau, 2024).

To determine if we could develop indices of the dimensions of resilience using the collection of individual questions within a resilience category, we performed a Cronbach's Alpha test for each resilience dimension. General acceptance in the literature for human dimensions research states that Cronbach's Alpha scores .65 and above are reliable, and the closer the score is to 1.0, the more reliable (Green et al., 1977; Spector, 1992; Vaske, 2008). All Cronbach's alpha tests showed scores higher than 0.65 (Table 4). Thus, we created aggregate indices averaging together the individual responses of specific questions within each resilience category to create five overall resilience perception scales.

Table 3. *Description of Coding for Independent Variables*

Variable	Assigned Coding
Retired	Not retired=0; retired=1
Residency	Under 30 years=0; over 30 years=1
Year Round	Not year-round resident=0; Year-round=1
Education	Less than high school, high school, 2-year degree, or some college=0; 4-year degree=1; professional degree or doctorate=2
Income	Less than 50k=0, 50-100k=1; More than 100k=2
Age	Over 60=0; Under 60=1
Fiscal	Very liberal, liberal=0; moderate=1; conservative, very conservative=2
Political	Very liberal, liberal=0; moderate=1; conservative, very conservative=2
Renter	Owner=0; Renter=1
Children	No children under 18=0; Children=1
Gender	Non-binary=0; Woman=1; Man=2
State	Maine=1; New Hampshire=2; New York=3; Vermont=4

Table 4. *Cronbach's Alpha Test*

Resilience Category	Score
Social	.8852
Economic	.8036
Public Infrastructure	.7787
Environmental	.6633
Overall	.8256

We then employed Variance Inflation Factor (VIF) tests to ensure the data was properly set up to conduct a series of multivariate regressions. VIFs specifically ensure that the regression coefficients are reliable and that the model's predictive power is not compromised by multicollinearity. High multicollinearity can inflate the variance of the coefficient estimates, making the model unstable. The VIF tests showed that collinearity was not an issue—all showing scores of 3 or less (O'Brien, 2007) and generally hovering above 1. The multivariate regressions were employed to assess how individual sociodemographic characteristics related to perceptions of community resilience. We made two key decisions about independent variables to construct our models. We removed race from the analysis because the sample—as well as the overall U.S. census demographics for the study area (USCB, 2024)—was predominantly white, thereby limiting our sample size for non-white respondents. In addition, we chose to include only political ideology (and not fiscal ideology) in the model, as political and fiscal ideology were perfectly collinear, showing a score of 1.000 in the pairwise correlation (pwcorr) test. The independent

variables for gender, employment, residency, education, income, and children were all included in the regression of resilience scores. A total of 678 people responded to the survey, with a response rate of 1.6%. The sample is described in Table 5.

Table 5. *Descriptive Statistics for Independent Variables*

Binary Variables	Mean	Std. Dev.	Min.	Max.
Age	0.38	0.48	0	1
Homeowner	0.05	0.23	0	1
Year Round	0.80	0.39	0	1
Children	0.71	0.45	0	1
Retired	0.35	0.47	0	1
Residency	0.41	0.49	0	1
Categorical Variables				Percent of Sample
Gender	Non-Binary			9.31%
	Women			47.71%
	Men			42.98%
Education	High school or less			29.10%
	4-year degree			33.23%
	Professional Degree or more			37.67%
Income	Less than \$50,000			59.53%
	\$50,000–\$99,999			28.86%
	\$100,000 or more			12.11%
Political	‘Very Liberal’ and ‘Liberal’			
	‘Moderate’			57.25%
	‘Very Conservative’ and ‘Conservative’			28.25%
State	Maine			28.10%
	New Hampshire			17.37%
	New York			23.26%
	Vermont			31.27%

Note: Observations: 678

4.0 Results

The resilience scores reported by all participants in the sample are summarized in Table 6, showing that the sample perceived their community's *Social Resilience* as the highest, followed by *Overall Resilience*, *Environmental Resilience*, *Economic Resilience*, and *Public Infrastructure Resilience*.

Table 6. *Average Resilience Scores*

Scales of Resilience	Mean
Social	6.32
Environmental	5.71
Economic	5.23
Infrastructure	5.21
Overall	6.14

The results of the multivariate regression, which gave us insight to which particular demographics had more or less influence on the scores reported by survey participants, are displayed below in Table 7 and further explained in the following text. Across all five multivariate models, we found that multiple sociodemographic factors were associated with perceptions of each dimension of resilience along with the aggregate resilience rating. In particular, we found that gender identity, education, income, political affiliation, and housing status had the most consistent relationships to perceptions of resilience throughout the five scales.

Gender identity was significant across multiple categories. Men perceived a slightly higher *Public Infrastructure Resilience* than women. Women and men both exhibited higher perceived *Social Resilience* compared to non-binary participants. Women rated their town's *Economic Resilience* higher than non-binary participants, and exhibited higher perceived *Environmental Resilience* compared to non-binary participants. Education was likewise significant: participants with college or post-college degrees had higher perceived *Social Resilience* and *Economic Resilience* compared to respondents without a high school degree, and participants with post-college degrees had higher perceived *Environmental Resilience* than those without a high school degree. Income was significant across four out of five scales, with the highest income category (over \$100k/year) being associated with higher perceived *Social Resilience*, *Economic Resilience*, *Public Infrastructure Resilience*, and *Overall Resilience*. Homeownership status was also significant: renters had a lower perceived *Social Resilience*, *Economic Resilience*, and *Overall Resilience* than homeowners.

Several other demographic variables were significant on some scales but were less consistent across categories. The relationship between perceived resilience and political affiliation varied. Moderates and conservatives both exhibited lower perceived *Economic Resilience* than liberals but had higher perceived *Public Infrastructure Resilience* than liberals. Moderates also had a lower perceived *Environmental Resilience* and *Overall Resilience* compared to liberals. Year-round residents had significantly lower perceived *Economic Resilience* compared to part-time residents, but differences were not significant for any other scales. Finally,

retired participants exhibited higher perceived *Economic Resilience* and *Public Infrastructure Resilience* compared to respondents who were not retired.

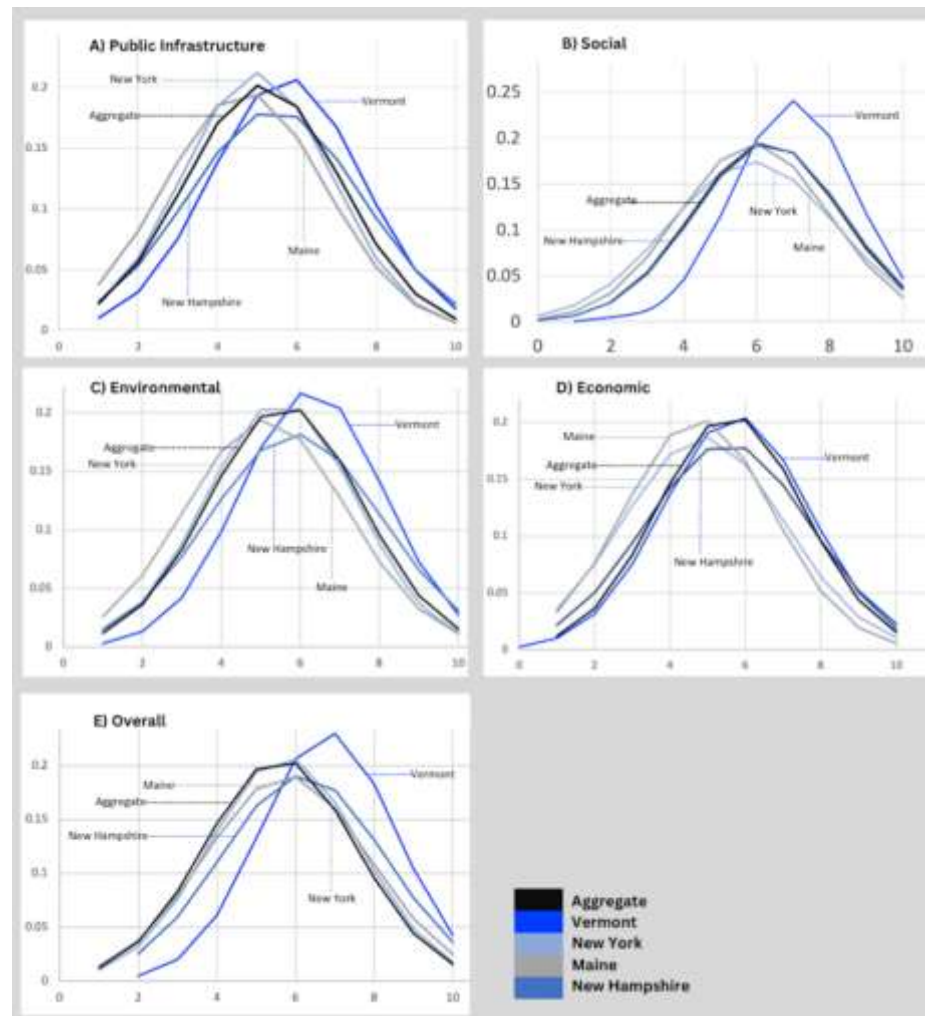
Table 7. *Multivariate Regression Results*

Variable	Social	Economic	Public Infrastructure	Environmental	Overall
Gender					
Woman	**0.307	*0.225	-0.008	*0.193	0.192
Man	*0.237	0.134	0.092	0.143	0.165
Education					
College	***0.257	**0.192	0.001	*0.145	0.138
Post-college	*0.170	*0.156	-0.093	0.090	0.018
Income					
\$50K-100K	-0.021	0.023	0.013	0.009	0.078
Over \$100K	**0.216	***0.276	**0.272	0.118	***0.380
Political					
Moderate	-0.037	-0.091	**0.203	-0.056	*-0.159
Conservative	-0.021	**0.220	***0.322	-0.082	-0.117
Age <60	-0.122	-0.021	0.065	-0.029	-0.081
Homeowner	*0.270	*-0.021	-0.159	-0.165	***-.549
Year Round	-0.115	*-0.130	-0.075	-0.115	-0.067
Children	-0.017	-0.039	-0.065	-0.057	-0.002
Retired	-0.002	*0.137	*0.149	-0.013	0.035
Residency >30	-0.020	-0.047	-0.36	-0.045	0.057
New Hampshire	0.136	*0.240	*0.230	*0.171	-0.030
New York	0.057	-0.023	0.073	0.068	*0.178
Vermont	***0.429	***0.302	***0.250	***0.273	*0.190
Intercept	3.259	3.157	2.995	3.727	3.621

The remaining demographics, including age (over or under 60), having children under 18, and residency in the community for less or more than 30 years, did not significantly impact perceptions of resilience for any scale.

State of residence had varying impacts on resilience perceptions. Vermont was the only state to have significantly higher perceptions of resilience across all scales. In New Hampshire, respondents had significantly higher perceptions of *Economic Resilience*, *Public Infrastructure Resilience*, and *Environmental Resilience* as compared to Maine. Maine residents had significantly lower perceptions of resilience compared to Vermont residents on all scales, and had significantly lower perceptions of *Economic Resilience*, *Public Infrastructure Resilience*, and *Environmental Resilience* when compared to New Hampshire. Respondents from New York had higher perceptions of *Overall Resilience*, but respondents' perceptions of specific areas of resilience were not significantly higher or lower on any other scale (see Figure 2). This is represented in Figure 2, which reports the distribution of the resilience score by each category. The distribution for *Public Infrastructure*, *Economic*, and *Environment* closely resembles each other, though the distribution for *Social* and *Overall* is slightly skewed toward higher resilience scores. As displayed, Vermont shows a higher reporting of resilience scores across all five categories.

Figure 2. Distribution of resilience scores.



State of residence had varying impacts on resilience perceptions. Vermont was the only state to have significantly higher perceptions of resilience across all scales. In New Hampshire respondents had significantly higher perceptions of *Economic Resilience*, *Public Infrastructure Resilience*, and *Environmental Resilience* as compared to Maine. Maine residents had significantly lower perceptions of resilience compared to Vermont residents on all scales, and had significantly lower perceptions of *Economic Resilience*, *Public Infrastructure Resilience*, and *Environmental Resilience* when compared to New Hampshire. Lastly, respondents from New York had higher perceptions of *Overall Resilience*, but respondents' perceptions of specific areas of resilience were not significantly higher or lower on any other scale (see Figure 2). This is represented in Figure 2, which reports the distribution of the resilience score by each category. The distribution for *Public Infrastructure*, *Economic*, and *Environment* closely resemble each other, though the distribution for *Social* and *Overall* is slightly skewed toward higher resilience scores. As displayed, Vermont shows a higher reporting of resilience scores across all five categories.

5.0 Discussion

This study examines the relationship between individual perceptions of community resilience and the extent to which they are associated with sociodemographic variables. This research area seeks to build on prior studies that address the way life experiences impact individuals' resilience (Archer et al., 2020; Sherrieb et al., 2010; Tuohy & Stephens, 2012).

Overall, we find that respondents perceive their community's *Social Resilience* as highest, while *Infrastructure Resilience* and *Economic Resilience* were lowest—potentially a reflection of the selection of counties within the NBRC regions. Highlighting this nuance and variability is important to enable community development planning that is grounded in the realities of its individual community members and recognizes the ways in which sociodemographic factors may affect how people perceive their communities and resilience. For example, Vale (2014) argues “due to cities and city-regions being organized in ways that both produce and reflect underlying socio-economic disparities, some parts are much more resilient than others and therefore vulnerability is linked to both topography and income” (p. 191). This paper extends the application of this argument to rural contexts. Further, this understanding of social capital as a strength among other assets in communities can be important to guiding effective community development strategy (Halstead et al., 2021).

Our findings indicate that personal identity affects how people perceive their community's resilience in multiple ways. In particular, higher levels of resilience are observed for people from higher income households, higher education, retirees and men and women as compared to nonbinary individuals. Renters are more likely to have lower economic and overall resilience scores, while political ideology had varying effects. These findings make important contributions to the concept of community participation in resilience planning. As discussed by prior scholars (Bullard, 2000; Fain, 1993; Franko, 2016), low-income residents are less likely to be able or willing to engage civically in their communities. The conclusion that these community members have differing perspectives on community resilience affirms that conventional approaches to gaining consensus on community planning will likely fall short in gathering inclusive perspectives.

Future research and planning can address these gaps, like Berkes and Ross (2013) suggest, by taking an integrated approach to community resilience through incorporating more targeted capacity building. For example, this study found that non-binary individuals and renters are two sociodemographic variables that may predict lower perceived community resilience. Non-binary respondents rated *Social Resilience* lower when compared to both men and women. Renters perceived less *Overall Resilience*, as well as *Social* and *Economic Resilience*. Further research may be able to identify, may contribute to, and promote the ways these particular groups access and build individual capacities, to enable more resilient communities overall.

Our findings provide support for, and expand the scope of, previous research by Sherman and Daigneault (2023), who examined demographic variables' impact on community resilience in Maine communities. Broadening out to additional states of the Northern Border Region, this data is consistent with this prior study in our findings that residents with higher household income, higher levels of education, and women—as compared to nonbinary people—continue to perceive greater resilience on most scales. In comparison to Sherman and Daigneault (2023), this study's data also contributes new information in its findings that women do not perceive public infrastructure significantly differently than men or nonbinary community members. Lastly, this study contributes the interesting finding that while residents perceive *Environmental Resilience* differently depending on their gender and level of education, political affiliation and income level do not have an effect. Further research can build on these findings by investigating areas of shared priorities and perceptions among different sociodemographic groups.

5.1 Limitations

The findings of this study are informed by a specific data collection effort in the Northern Border Region. Any suggested conclusions are limited to the individuals this data collection was able to reach. Recent data show a decline in response rates to survey-based data collection efforts; a trend that has been documented for some time and was found to accelerate during the COVID-19 pandemic (Krause et al., 2024). This study made its best efforts to encourage high response rates through direct mailing and incentives, yet the respondents of this study skew toward white, older, more educated, and higher income respondents. This is concerning as these individuals have the highest levels of resilience per our study, which suggests that our data is skewed to reflect this population. Furthermore, the racial homogeneity of this study's sample (86.4% white) did not allow the data to speak to resilience perceptions among non-white groups given the sample sizes. Future research in majority-white communities like the Northern Border Region should investigate the resilience perceptions among residents of color through focus groups or other targeted methods.

6.0 Conclusion

This study's focus on how certain demographic factors impact resilience contributes intends to guide policy makers, community planners, and investors to better understand their stakeholders when making planning decisions. The findings highlight residents with higher incomes, higher education levels, and retirees tended to perceive higher levels of resilience, particularly in the social and environmental domains, while nonbinary individuals and renters consistently reported lower levels of resilience, especially in economic and overall categories.

These findings suggest that community resilience is not uniformly experienced across populations living within the same geographic area. Instead, resilience appears socially differentiated, with individuals possessing greater economic stability and institutional access tending to perceive stronger resilience overall. This has important implications for resilience planning processes that rely heavily on public participation, as the voices most represented in planning may not reflect the experiences of more vulnerable populations.

The disparities in perceived resilience emphasize the need for more inclusive and targeted approaches to community development. The fact that nonbinary individuals and renters experience lower levels of perceived resilience suggests a gap in resource allocation and community support for these groups. This underscores the importance of inclusive planning, which ensures that diverse perspectives are considered in building resilient communities. The consistency of some findings with prior research, such as the relationship between higher household income and resilience perceptions, expands on previous studies. Ultimately, this research provides actionable insights for policymakers and community planners. By identifying specific demographic groups that perceive lower resilience, future initiatives can focus on improving resource distribution and fostering participation among these groups. This study contributes to the broader understanding of resilience in rural areas and highlights the importance of targeted, inclusive strategies to bolster resilience across different domains.

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