EMPIRICAL RESEARCH

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Similarities and Differences in Adolescents' Organized and Civic Activity Networks across Rural and Non-Rural Communities

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Abstract

Youth are often involved in multiple organized and civic activities simultaneously, resulting in complex patterns or "networks" of participation. Little research has examined the network structure of adolescents' organized and civic participation and whether these networks vary across communities. Examining activity networks may help identify specific forms of participation that are more widely and strongly connected with other activities, and may thus provide a gateway for becoming multiply involved. Youth ($N = 902$; $M_{age} = 15.90$; 55.7% female) from a rural ($n = 476$) and non-rural ($n = 426$) community completed measures assessing engagement in 25 civic and organized activities. Network analysis indicated that activities in the rural community had greater network density relative to the non-rural community. Volunteering to clean up the neighborhood was most central to both networks. Church attendance and community sports were more central for the rural network, whereas protesting and school arts were more central for the non-rural network. These findings suggest that volunteer activities may serve as a "hub" for organized and civic activity participation and highlight similarities and differences in the co-occurrence of activities across two distinct communities.

Introduction

Involvement in organized and civic activities represents an important component of positive youth development (Lerner et al. 2005). Organized activities refer to a range of adult-sponsored group events that exist outside the traditional school curriculum, such as church, school and community clubs, sports, and arts/music (Ferris et al. 2013). Civic activities represent efforts focused on social contribution, such as community service, political engagement, and conservation (Wray-Lake et al. 2017). Organized and civic activities often co-occur, which may indicate that involvement in specific activities motivates or facilitates involvement in others (Zaff et al. 2010). Research examining connections among organized and civic activities typically combines measures (Darling 2005), examines linear associations between them (Zaff et al. 2003), or examines person-centered patterns of engagement (Metzger et al. 2009). Less research has examined "networks" of activity involvement by documenting patterns of complex unique associations between activities. Identifying the specific connections among organized and civic activities may provide novel insight into how and why some youth become involved in multiple activities, which could help to optimize the benefits affiliated with activity involvement (Vandell et al. 2015). Additionally, participation in organized activities varies across community and school contexts (Elder and Conger 2000). Connections between organized and civic activity may differ for youth from rural and non-rural communities, with activities in rural communities demonstrating greater integration due to less competition and greater overlap among activity leaders (Ferris et al. 2013). Using a network analysis approach, the current study examined the structure of organized activity and civic networks among youth from a rural and non-rural community, and compared whether network characteristics differ for youth from each community.

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Organized and Civic Activity Involvement

Ecological models of development highlight that youth are embedded within a variety of contexts that interact with their own individual characteristics to influence development (Overton 2013). Some scholars have refined theory on ecological systems to highlight the networked structure of youth's ecology through social interactions across settings (e.g., school, church, family; Neal and Neal 2013). The nested structure of youth's ecology is thought to produce different experiences across schools and communities (Barker and Gump 1964). Thus, the way that adolescents' ecologies are networked may differ across communities and capturing these differences is necessary to gain a more complete understanding of adolescent development.

Scholars have used ecological systems theories to examine the antecedents and benefits of engaging in organized and civic activities (Vandell et al. 2015). This research consistently demonstrates that youth who are involved in at least one organized or civic activity are typically involved in other organized or civic activities (Zaff et al. 2010). Certain organized and civic activities may have important features that facilitate involvement in other activities, such as a common motivation for participation, established channels for recruitment, or structured experiences that span multiple activity categories (e.g., a sports team raising money for a charity). Involvement in specific activities longitudinally predicts greater involvement in other activities overtime. For instance, greater high school sport and club involvement predicts community service one year later and greater community service predicts higher levels of club involvement one year later (Oosterhoff et al. 2017b). Specific organized and civic activities may therefore provide youth with a pathway to become involved in a wider array of other activities overtime. Understanding how organized and civic activities coalesce may inform efforts to integrate activity experience and ultimately enhance the benefits of participation.

A Network Approach to Organized and Civic Activity Involvement

Prior research has often examined organized activity involvement and civic engagement as a progression whereby specific activities are modeled as a linear function of other activities (e.g., Zaff et al. 2003). Such analyses are useful for establishing initial connections among organized and civic activities, yet these analyses assume that the connections among different types of activities are similar in their strength and degree. However, it is possible that the relative strength of connection may vary across different combinations of activities. Some researchers have used person-centered approaches to document profiles of involvement to better account for the wide array of adolescent organized and civic participation (Metzger et al. 2009). Person-centered techniques identify clusters of youth who are similarly involved in different patterns of organized and civic activities and captures heterogeneity in patterns of correlations that differ across people. However, such analyses do not provide information about the ways in which specific activities are associated with other activities, and how these connections may differ across context. The independent relations between organized and civic activities are likely numerous, nuanced, and contextualized based on the structure of the activity and community. Thus, analytic techniques are needed to quantify the variety and strength of unique connections between activities and whether these connections vary for youth across schools and communities. Documenting activity networks may provide important theoretical and practical insights into how civic and organized activities are connected. For instance, specific organized or civic activities may be more strongly associated with a wider variety of other activities, while others may be more isolated having weaker or fewer connections with other activities. Quantifying the degree of unique links across a network of activities may help identify activities that are most central to youth organized activities experiences through their connection to other activities. Understanding which activities are central to youth's overall network may inform theory regarding *why* activities are interconnected and provide an important point of intervention for those seeking to increase activity participation.

Network analysis is an analytic technique that uses graph theory to investigate the structure of interconnectivity between variables or people (Borgatti et al. 1999). Activities in a network are represented by *nodes*. Associations between nodes are represented by *edges* that connect the nodes, which vary in thicknesses represented by *weights*. Weights in network analysis correspond to the strength of a partial correlation between two nodes after accounting for all other variables in the model and correcting for multiple testing. Networks are often visualized to allow insight into the complex relations among all modeled activities. The overall variety of edges and strength of weights within a network can be summarized to indicate a network's *density* which represents the degree of interconnectivity among nodes in a network. Network analytic techniques can also identify activities that are most *central* and influential within the overall network. Central activity nodes are those that have a greater number of strong connections to other nodes and subsequently serve as "hubs" between disparate nodes (Freeman 1978). Centrality can be assessed using a variety of different methods. However, scholars have recently proposed "expected influence" (EI; Robinaugh et al. 2016) as a robust indicator of centrality, which is calculated by summing all of a node's positive and negative

edge weights with other nodes. A comparison of EI values for an activity network would lend insight into which activities are central to the coherence of network structure, in that they have more strong and diverse unique connections with other activities.

Scholars have not yet examined the structure of youth's organized and civic activity networks. However, there is reason to suspect that certain forms of civic and organized activity involvement may be more central to youth's network relative to others. For instance, various forms of community service are often incorporated into other forms of activity involvement, such as church (e.g., Krause 2009), sports (e.g., Kay and Bradbury 2009), clubs, arts, and music (e.g., Shelly 2011). Participating in community service tends to be moderately correlated with participation in other organized activities (Oosterhoff et al. 2018) and some evidence indicates that community service—but not other forms of civic and organized activities—is bidirectionally associated with organized activity involvement over time (Oosterhoff et al. 2017b). Community service may therefore have a higher expected influence and be more central to youth's activity networks in that it will be more strongly and widely connected to other forms of involvement compared to other activities. Testing this proposition may help further elucidate how activities are interconnected with one another and provide insight into whether certain activities—such as community service —may serve as a "hub" that potentially provides an avenue for youth become engaged in other activities, ultimately enhancing their ecological assets (Bowers et al. 2014).

Contextual Similarities and Differences in Activity Networks

Ecological systems theory highlights that youth's micro-ecological networks are contextually dependent and may differ across community and school contexts (Neal and Neal 2013). Several contextual features may be relevant for youth civic and organized activity involvement (e.g., Zaff et al. 2010), yet the degree of community rurality may be especially important to consider for organized and civic activity participation. Rural and non-rural communities systematically vary on a variety of characteristics that may alter the participation rate, structure, and experiences of organized and civic activities. Specifically, rural communities often have smaller school sizes, less racial and ethnic diversity, greater poverty, greater religiosity, and greater conservativism relative to non-rural communities (Elder and Conger 2000). In terms of participation, youth in rural communities are engaged in a greater breadth of organized activities relative to non-rural youth (Elder and Conger 2000), which may be due to smaller schools having less competition for activity membership or greater recruitment

efforts by activity leaders to maintain minimum enrollment (Hardré et al. 2009). Structurally, community leaders often serve multiple roles across activities and organizations in rural communities, thus providing greater opportunities for youth connected with these leaders to become multiply involved (Elder and Conger 2000). Experiences within activities are also thought to vary across rural and non-rural areas, with certain activities (e.g., religious activities, sports) providing a greater sense of cohesion and pride for rural youth relative to non-rural youth (Ferris et al. 2013).

Variation in the participation, structure, and experiences of organized and civic activities among rural and non-rural youth may contribute to differences in activity network structure. For instance, less competition for activities and greater consistency in activity leaders may make activity networks more dense and integrated in rural communities, which would be represented by a greater number of strong unique associations between activities relative to non-rural communities. Conversely, for youth in non-rural communities, participation may be more specialized and selective. This would lead to a lower density in the activity network indicated by fewer and weaker unique associations between activities. Additionally, there may also be community differences in which activities are more central to the activity network structure. Religious institutions serve as gatherings used to establish social networks for rural community members (Elder and Conger 2000; Fischer 1982) and may provide greater opportunities for community leaders to connect or recruit youth for activity involvement. Additionally, involvement in some community clubs such as 4-H, Boy/Girl Scouts, and Future Farmers of America are more prominent in rural areas (Ludden 2011) and may serve to connect rural youth with opportunities to participate in other community events. Church and community clubs may therefore be more central (i.e., higher EI) to rural activity networks relative to non-rural activity networks. Examining general network density and specific activity centrality differences among rural and non-rural youth may provide greater insight into the contextual sensitivity of organized and civic networks. Such efforts can inform theory and policy regarding adolescent development within rural communities by providing insight into which youth have access to different activities and how this access overlaps across different forms of participation.

Current Study

This study has two aims. The first aim was to use network analysis to examine the structure of organized and civic activity networks among youth from a rural and non-rural community. Network analysis is largely exploratory, and thus this first aim was to provide a general description of

network features including the density of each network and relative centrality of each activity across networks. However, based on prior research demonstrating longitudinal, bidirectional links between community service and organized activities (Oosterhoff et al. 2017b), it was generally expected that community service would have a more central role within the network relative to other activities for both communities. The second aim was to formally compare the density and centrality of activities across rural and non-rural communities. Based on developmental theory and research (Elder and Conger 2000), it was hypothesized that activity involvement in rural communities would have a stronger network density relative to activity involvement in non-rural communities and that church and community club involvement would be more central in the network structure among rural youth relative to non-rural youth.

Methods

Participants and Procedures

Data were drawn from the third wave of the Youth Civic Development Project (YCDP). The YCDP is a 3-year longitudinal study examining civic development among youth from rural and city environments. The total analytic sample consisted of 902 adolescents ($M_{age} = 15.90$, $SD = 1.27$, Range $= 13–19$ years, 55.7% female). Adolescents were Caucasian/White (90.0%), African American (2.6%), Asian/Pacific Islander (2.0%), biracial (6.7%), or Other (2.9%). Fourteen (1.5%) participants failed to report their ethnicity. Students' report of their GPA indicated that 34.4% of the sample earned "Mostly A's." Adolescents' parents varied in their highest attained education levels, ranging from completed 8th grade (3.4% mothers, 4.9% fathers), high school graduates (33.2% mothers, 35.8% fathers), completed college (38.2% mothers, 30.2% fathers), and completed a graduate degree (e.g., PhD, MBA; 16.6% mothers, 16.9% fathers). Some participants were unsure of either parents' education level (5.1%).

Participants for the YCDP were recruited from two public high schools. Table 1 displays sample, school, and community characteristics of both samples. Participating adolescents from the small, rural town ($n = 476$) resided in a community with a population of 7000, which was located approximately 50 miles from the nearest city with a population of 25,000 or more. According to the most recent data from the U.S. Census Bureau (2010), the county from which these adolescents were drawn has been designated as "rural." Students from the non-rural mid-sized city ($n = 426$) resided in a community with a population of 30,000. This mid-sized city represents the economic, commercial, and medical epicenter of the region. School and community

Table 1 Descriptions of high schools surveyed in this study

	Rural school N (%)	Non-rural school N (%)
Sample characteristics		
Age	$M = 16.02$ (SD = 1.19)	$M = 15.75$ (SD = 1.32)
Gender (Female)	262 (55%)	240 (56%)
Race/Ethnicity		
Caucasian/White	453 (95.4%)	337 (81.6%)
African American	9 (1.9%)	36 (8.7%)
Asian/Pacific Islander	3 (0.6%)	17 (4.1%)
Biracial	15 (3.1%)	27 (5.7%)
Other	3 (0.6%)	11 (2.7%)
Mother's Education		
Completed 8th grade	23 (4.8%)	8 (1.9%)
High school graduates	188 (39.5%)	109 (25.8%)
Completed college	172 (36.4%)	170 (39.9%)
Graduate degree	53 (11.2%)	97 (22.8%)
Father's Education		
Completed 8th grade	31 (6.5%)	13 (3.1%)
High school graduates	199 (41.8%)	117 (27.5%)
Completed college	138 (29.0%)	129 (30.3%)
Graduate degree	32 (6.7%)	117 (27.9%)
School and community characteristics		
Enrollment	822	1792
Minority enrollment	4%	19%
Teacher/Student ratio	18:1	19:1
Free and reduced lunch	42%	28%
Graduation rate	92%	90%
Community size	~7,000	~30,000

School and community characteristics obtained from usnews.com

level descriptive statistics indicate that general student enrollment, minority student enrollment, and community size were smaller for the rural compared to non-rural school. School level statistics also indicate that a greater percentage of students in the rural school received free or reduced lunch relative to the non-rural school. The student to teacher ratio and graduation rate were comparable across schools.

Questionnaires were administered in participants' social studies classrooms during regularly scheduled class time. All adolescents enrolled in social studies classes were eligible to participate and only those who obtained both signed parental permission and completed adolescent assent forms were allowed to complete the study. For the rural school, approximately $N = 600$ (73%) of the student population was eligible, providing a participation rate of 79% of eligible participants which represented 58% of the student body. For the non-rural school, approximately $N = 800$ (44%) of the student population was eligible, proving a participation rate of 53% of eligible participants which represented 24% of

the student body. Participant characteristics were consistent with school-level characteristics, suggesting that these subsamples reflect the demographics of the schools from which they were recruited (Table 1). Members of the research team were available to answer participants' questions. Participants were eligible to win randomly drawn cash prizes ranging in value from $25 to $100.

Measures

Organized and civic activity categories

Involvement in organized and civic activities was assessed using a measure adapted from prior research (e.g., Metzger and Smetana 2009). The measure contained 25 items spanning four types of civic activities (i.e., informal helping, community service, political engagement, conservation) and four types of organized activities (i.e., arts, sports, clubs, religious involvement). Exact wording for all items is displayed in Table 2. Items were designed to capture involvement across school and community contexts and activity groupings were determined based on prior research (e.g., Oosterhoff et al. 2017a). Youth were asked the extent which they participated in each activity in an average month and responses ranged from 1 (*never*) to 5 (*very often*). Subjective ratings of participants' involvement were preferred over estimated hours to ensure measurement equivalence across time demands and seasonal differences of different types of activities (Bohnert et al. 2010). All items were modeled separately.

Informal helping

Consistent with prior research (Metzger et al. 2018), two items assessed youth's informal helping though the frequency at which they reported helping their neighbors for no pay and helping their family around the house. These items were moderately correlated in each community (rural: $r = 0.41$, non-rural: $r = 0.35$).

Community service

Four items measured adolescents' involvement in various types of community service, including volunteering to clean up one's community, working for a charity, volunteering to help the poor or sick, and participating in community service mandated by school. Items were moderately correlated in each community (rural: $rs = 0.41$ to 0.58, non-rural: $rs = 0.42$ to 0.60).

Political engagement

Political engagement was measured using four items assessing the extent which youth keep up with political and current events, participate in protesting, participate in a political organization or union, and participate in a political social group. Items were moderately correlated in each community (rural: $rs = 0.22$ to 0.63, non-rural: $rs = 0.20$ to 0.60).

Conservation

Conservation behaviors were assessed with three items which assessed the frequency that youth turn off electronics that are not in use, recycle, and limit paper use. Items were moderately correlated in each community (rural: $rs = 0.29$ to 0.48, non-rural: $rs = 22$ to 0.48).

Arts

Participation in arts was measured with two items assessing the frequency youth are involved in school and community arts, music, or drama programs. Items were highly correlated within each community (rural: $rs = 0.69$, non-rural: $rs = 0.68$).

Sports

Participation in sports was measured with two items assessing the frequency youth are involved in school and community sports team. Items were highly correlated within each community (rural: $rs = 0.60$, non-rural: $rs = 0.58$).

Clubs

Involvement in school and community clubs was measured with five items which assessed the frequency of youth participation in community social clubs, community groups such as boy/girl scouts or YMCA, computer, language or academic clubs, 4-H, or student council. Items were moderately correlated within each community (rural: $rs = 0.26$ to 0.46, non-rural: $rs = 0.15$ to 0.35).

Religious involvement

Participation in religious activities was assessed with three items measuring the frequency at which youth attend religious services, participate in religious community service, and attend religious school clubs. Items were highly correlated within each community (rural: $rs = 0.83$ to 0.84, non-rural: $rs = 0.75$ to 0.81).

Analytic technique

The purpose of this study was to examine the network structure of organized and civic activities within and across a rural and non-rural community. Thus, the primary

Table 2 Node names and item wording for networked activities

Activity	Node name	Item wording
Informal helping		
Help neighbors	helpneigh	Help your neighbors out on projects at their home/farm for no pay
Help family	helpfam	Help your family around the house (baby-sit, prepare meals, mow the lawn, etc)
Community Service		
Clean neighborhood	cleanneigh	Volunteer to clean up your neighborhood, school or community
Help sick	helpsick	Volunteer to help poor, sick, or disabled people in your community
Work for charity	charity	Work for charity to collect money for a social cause
Mandatory service	manserv	Participate in community service projects that are REQUIRED BY YOUR SCHOOL
Political Engagement		
Political party/union	polpar	Participate in an organization affiliated with a political party or union
Political organization	polorg	Participate with an organization focused around a political or social cause
Protest	protest	Take part in a political rally or protest
Current events	curevent	Know what's going on in the news and about political events
Conservation		
Limit paper	limpaper	Try to limit how much paper I use to help the environment
Recycle	recycle	Put recyclable waste items into the correct recycling bin
Turn off electronics	limelec	Turn off electronics when I'm not using them
Arts		
Community arts	cart	Take part in local or community art, music, or drama organization
School arts	scart	Take part in school art, music, or drama group
Sports		
Community sports	comsport	Participate in a local or community sports team outside of school
School sports	ssport	Participate with a school sports team
Clubs		
4-H	4 h	Attend 4-H sponsored meetings or events
Community clubs	comclub	Take part in a community club/group (Boy/Girl Scouts, YMCA, etc)
School club	schclub	Take part in a computer, language, or academic club at school
Social club	socclub	Participate in a community social club
Student council	studentco	Take part in student council or hold school political positions
Religious Involvement		
Attend service	relserv	Attend religious services
Religious school	relsch	Participate in religious school activities
Religious com service	relcomserv	Participate in religious community service activities

Participants indicated the extent to which they participated in each activity in an average month. Each activity was modeled separately

analyses concerned estimating the network structure of 25 activities. Separate network analyses were performed on identical items administered to youth within these distinct communities.

Graphical LASSO

Graphical LASSO (Least Absolute Shrinkage and Selection Operator) algorithm was used to compute and visualize partial correlation networks using the glasso (Friedman et al. 2010) and qgraph (Epskamp et al. 2012) packages in R (R Core Team 2017). The graphical LASSO algorithm computes partial polychoric correlations between all variables within the network. The graphical LASSO algorithm then constrains very small edges to zero through an L1 penalty to guard against Type 1 error. The resulting network is comprised of edges that are most likely to be observed above chance. For example, in the organized activity and civic engagement network, each node represents an activity, and each edge represents a partial correlation between activities after adjusting for correlations with all other activities. The magnitude of the correlation is signified by the thickness of an edge (depicted as a line joining the activities), with thicker edges indicating larger partial

correlations. Consistent with prior research (Bellet et al. 2018), a gamma (γ) hyperparameter of 0.5 for the graphical LASSO was selected to ensure the specificity of the networks (Epskamp and Fried 2018). This method of network analysis allows the examination of relationships between activities while accounting for correlations with other activities (McNally 2016). Additionally, this method allows an examination of which organized and civic activities are more central to the overall network.

Bridge expected influence

To identify which civic and organized activities are most central to the overall network, the one-step expected influence (EI; Robinaugh et al. 2016) procedure was calculated using the networktools package in R (Jones 2017). EI is preferable to other centrality measures when networks include possible negative edges (i.e., negative partial correlations among some activities; Robinaugh et al. 2016). Although participation in different organized activities are often positively correlated, certain activities (e.g., arts and sports) may be negatively correlated. Thus, EI is preferred over other metrics of centrality. One-step EI is a measure of node centrality that determines the strength of a node's association with other nodes while accounting for negative correlations. Each node is given a value consisting of the sum of its edges, retaining the positive or negative sign of these edges in the sum. Thus, nodes with higher values are more central, and the type of association (positive or negative) on neighboring nodes is retained (Robinaugh et al. 2016). Nodes that are more central to the network therefore represent activities that are more strongly, diversely, and positively associated with other activities after accounting for possible shared variance among all other activities and correcting for Type I error.

Involvement in specific organized and civic activities were assessed with multiple items modeled independently, with some activities measured with more items than others. Thus, the EI of any given node may be disproportionately higher for activities measured by higher numbers of items. To account for this dependency, the *bridge expected influence* (BEI) was computed which represents a metric that assesses the EI of a node from one family or category of activities (e.g., community service) on nodes of another family of activities (e.g., sports) and vice versa (Jones 2017). BEI calculates one-step EI for a given node but only includes nodes that belong to a different "family" as its potential neighbors. In other words, the BEI of a community service activity measures the degree to which that a specific activity is connected with all other activities within in the network, but excludes connections with other community service activities in the summary statistics.

BEIs were calculated for all nodes for rural and non-rural activities accounting for activity type. To identify the most and least central activities within rural and non-rural communities, a descriptive overview of activities within the upper and lower quartiles of BEIs was provided. To compare the activity centrality across rural and non-rural communities, the BEI estimate and standard deviation for each activity in each community was calculated using the graphical LASSO matrix algorithm and estimated a series of independent sample *t*-tests. False Discovery Rate (FDR) correction was applied to account for multiple testing.

Network density

For valued (i.e., non-binary) data, network density represents the sum of all tie strengths. Network density provides an overall estimate of the extent to which activities are connected within a given network. Network density was calculated using UCINET software (Borgatti et al. 1999) based on the corrected partial correlation matrix produced by the graphical LASSO algorithm. The UCINET software was chosen because it provides the standard deviation around the network density sum thus allowing for formal comparisons across networks using independent samples *t*-tests.

Network stability

Network stability provides an estimate of how much centrality estimates are sensitive to the removal of cases from the data. To determine the stability of the network, the bootnet package in R (Epskamp and Fried 2018) with 1000 boostraps was used to determine the proportion of cases that could be eliminated while retaining a correlation of at least 0.70 with the original centrality estimates within a 95% confidence interval (see Bellet et al. 2018). This metric was calculated for edge weights and BEI values.

Missing data

Low levels of missing data ranged from 0 to 1% across study variables and was primarily due to participants missing specific items. Missing data was estimated using Multiple Imputation (MI). All findings were consistent with and without the use of MI.

Results

Preliminary Analyses

Descriptive statistics including means, standard deviations, and bivariate correlations among all study variables for each community are provided in Tables 3 and 4. In general,

Table 3 Means, standard deviations, and bivariate correlations among all activities for youth in rural communities

	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. Help neighb.	2.80	1.37	0.41	0.44	0.37	0.27	0.28	0.23	0.21	0.14	0.19	0.16	0.20	0.22	0.00	−0.05	0.26	0.18	0.35	0.23	0.14	0.14	0.12	0.21	0.17	0.21
2. Help family	4.19	0.96		0.32	0.19	0.24	0.18	0.10	0.09	0.04	0.17	0.19	0.18	0.19	0.07	0.04	0.19	0.12	0.12	0.10	0.12	0.11	0.11	0.17	0.18	0.21
3. Clean neighb.	2.11	1.19			0.56	0.58	0.52	0.32	0.38	0.32	0.20	0.39	0.36	0.17	0.24	0.14	0.35	0.24	0.42	0.47	0.30	0.41	0.34	0.25	0.27	0.32
4. Help sick	2.51	1.29				0.53	0.41	0.32	0.33	0.22	0.12	0.29	0.28	0.11	0.28	0.19	0.27	0.17	0.34	0.32	0.30	0.37	0.22	0.29	0.30	0.35
5. Work for char.	2.06	1.13					0.47	0.26	0.32	0.22	0.20	0.36	0.31	0.09	0.32	0.19	0.32	0.23	0.32	0.36	0.34	0.47	0.31	0.29	0.30	0.34
6. Mand. service	2.35	1.23						0.25	0.30	0.20	0.21	0.23	0.26	0.05	0.24	0.24	0.33	0.28	0.27	0.39	0.32	0.41	0.38	0.27	0.24	0.29
7. Political party	1.45	0.84							0.63	0.52	0.22	0.21	0.11	0.11	0.14	0.08	0.20	0.15	0.36	0.27	0.24	0.34	0.31	0.16	0.16	0.17
8. Political org	1.60	0.95								0.51	0.33	0.27	0.20	0.16	0.21	0.16	0.21	0.16	0.34	0.29	0.32	0.40	0.43	0.26	0.25	0.27
9. Protest	1.35	0.74									0.30	0.29	0.24	0.17	0.18	0.10	0.09	0.09	0.26	0.20	0.22	0.25	0.27	0.09	0.10	0.10
10. Current event.	2.89	1.28										0.22	0.27	0.21	0.20	0.17	0.14	0.15	0.20	0.17	0.22	0.21	0.30	0.16	0.17	0.20
11. Limit paper	2.08	1.16											0.48	0.35	0.28	0.21	0.15	0.11	0.18	0.23	0.23	0.28	0.22	0.13	0.15	0.14
12. Recycle	2.94	1.30												0.29	0.28	0.22	0.23	0.17	0.13	0.21	0.27	0.26	0.16	0.11	0.12	0.15
13. Turn off elec.	2.74	1.41													0.05	−0.01	0.02	0.02	0.18	0.12	0.11	0.08	0.13	0.13	0.15	0.16
14. Comm arts	2.12	1.43														0.69	0.15	0.10	0.19	0.24	0.31	0.44	0.20	0.12	0.17	0.19
15. School arts	2.35	1.52															0.09	0.10	0.12	0.18	0.23	0.33	0.16	0.12	0.14	0.15
16. Comm sports	2.61	1.60																0.61	0.19	0.40	0.27	0.33	0.23	0.31	0.31	0.33
17. School sports	3.04	1.66																	0.12	0.31	0.22	0.34	0.27	0.36	0.34	0.34
18. 4-H	1.50	1.05																		0.43	0.26	0.33	0.19	0.19	0.17	0.24
19. Comm clubs	2.07	1.36																			0.33	0.42	0.37	0.19	0.22	0.26
20. School club	2.45	1.44																				0.36	0.27	0.26	0.24	0.26
21. Social club	2.28	1.30																					0.42	0.27	0.29	0.29
22. Student coun.	1.67	1.23																						0.24	0.24	0.30
23. Rel serv	2.86	1.51																							0.83	0.83
24. Religious sc.	2.41	1.46																								0.84
25. Rel com serv	2.39	1.44																								

Neighb neighborhood, *Char* charity, *Mand.* mandatory, *Org* organization, *Elect* electronics, *Comm* community, *Cou* council, *Serv* service, *Sc* school, *Rel* religious

Bolded values are significant at $p < 0.05$

Table 4 Means, standard deviations, and bivariate correlations among all activities for youth in non-rural communities

	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1. Help neighb.	2.45	1.31	**0.35**	**0.42**	**0.33**	**0.27**	**0.19**	**0.15**	**0.11**	**0.18**	0.09	**0.16**	**0.21**	**0.18**	**0.11**	0.09	**0.19**	**0.11**	**0.23**	**0.17**	0.08	**0.20**	0.06	**0.13**	**0.19**	**0.20**
2. Help family	4.19	0.89		**0.22**	**0.21**	**0.15**	**0.17**	**0.11**	**0.12**	**0.11**	**0.12**	**0.14**	**0.28**	**0.10**	0.05	0.03	0.05	0.03	0.09	**0.17**	**0.05**	**0.20**	0.06	0.07	0.08	0.09
3. Clean neighb.	2.17	1.19			**0.56**	**0.52**	**0.50**	**0.30**	**0.34**	**0.31**	**0.16**	**0.37**	**0.35**	**0.15**	**0.26**	**0.17**	**0.16**	0.06	**0.32**	**0.32**	**0.28**	**0.33**	**0.31**	0.08	**0.18**	**0.23**
4. Help sick	2.61	1.20				**0.60**	**0.45**	**0.27**	**0.38**	**0.32**	**0.11**	**0.33**	**0.25**	**0.13**	**0.29**	**0.21**	**0.17**	**0.12**	**0.17**	**0.29**	**0.32**	**0.39**	**0.28**	**0.23**	**0.32**	**0.36**
5. Work for char.	2.14	1.10					**0.42**	**0.31**	**0.42**	**0.32**	**0.14**	**0.25**	**0.26**	0.06	**0.32**	**0.22**	**0.19**	**0.14**	**0.26**	**0.31**	**0.32**	**0.42**	**0.29**	**0.12**	**0.20**	**0.27**
6. Mand. service	2.69	1.34						**0.23**	**0.34**	**0.19**	**0.24**	**0.32**	**0.31**	0.09	**0.27**	**0.24**	**0.17**	**0.14**	**0.16**	**0.34**	**0.42**	**0.34**	**0.32**	0.07	**0.11**	**0.18**
7. Political party	1.45	0.76							**0.60**	**0.52**	**0.32**	**0.13**	**0.15**	0.05	**0.18**	0.06	0.07	0.04	**0.22**	**0.27**	**0.25**	**0.18**	**0.35**	-0.02	0.07	**0.11**
8. Political org	1.69	0.98								**0.47**	**0.28**	**0.19**	**0.17**	0.01	**0.26**	**0.16**	0.08	0.08	**0.19**	**0.27**	**0.35**	**0.37**	**0.39**	0.06	**0.12**	**0.12**
9. Protest	1.36	0.67									**0.20**	**0.28**	**0.23**	0.08	**0.25**	**0.16**	0.06	-0.04	**0.27**	**0.18**	**0.16**	**0.16**	**0.25**	-0.03	0.03	**0.12**
10. Current event.	3.12	1.19										**0.18**	**0.29**	**0.17**	**0.13**	**0.16**	0.00	-0.04	0.00	**0.17**	**0.23**	**0.16**	**0.24**	-0.05	-0.01	-0.02
11. Limit paper	2.31	1.17											**0.48**	**0.34**	**0.20**	**0.26**	**0.10**	0.07	**0.14**	**0.17**	**0.24**	**0.21**	0.17	-0.03	0.06	0.08
12. Recycle	3.31	1.27												**0.22**	**0.21**	**0.29**	**0.10**	0.07	**0.13**	**0.12**	**0.22**	**0.16**	**0.15**	-0.01	0.03	0.08
13. Turn off elec.	2.89	1.48													0.07	**0.10**	0.00	-0.08	0.09	0.07	0.05	0.04	-0.06	-0.01	**0.11**	0.04
14. Comm arts	2.05	1.43														**0.67**	-0.03	-0.08	**0.15**	**0.26**	**0.33**	**0.23**	**0.18**	0.07	**0.10**	**0.14**
15. School arts	2.30	1.59															-0.07	-0.05	**0.11**	**0.17**	**0.29**	**0.23**	**0.16**	002	0.06	**0.10**
16. Comm sports	2.66	1.64																**0.58**	0.08	**0.13**	**0.13**	**0.29**	**0.12**	0.08	0.09	**0.13**
17. School sports	3.22	1.69																	0.03	0.01	0.04	**0.29**	**0.10**	**0.19**	**0.16**	**0.18**
18. 4-H	1.30	0.73																		**0.30**	**0.16**	**0.15**	**0.18**	-0.01	0.08	**0.12**
19. Comm clubs	1.76	1.21																			**0.22**	**0.36**	**0.23**	0.07	**0.12**	**0.14**
20. School club	2.45	1.55																				**0.35**	**0.34**	**0.10**	0.09	**0.18**
21. Social club	2.49	1.32																					**0.26**	**0.16**	**0.20**	**0.21**
22. Student coun.	1.65	1.20																						0.00	0.03	0.06
23. Rel serv	2.90	1.42																							**0.75**	**0.75**
24. Religious sc.	2.42	1.40																								**0.81**
25. Rel com serv	2.33	1.32																								

Neighb neighborhood, *Char* charity, *Mand.* mandatory, *Org* organization, *Elect* electronics, *Comm* community, *Cou* council, *Serv* service, *Sc* school, *Rel* religious

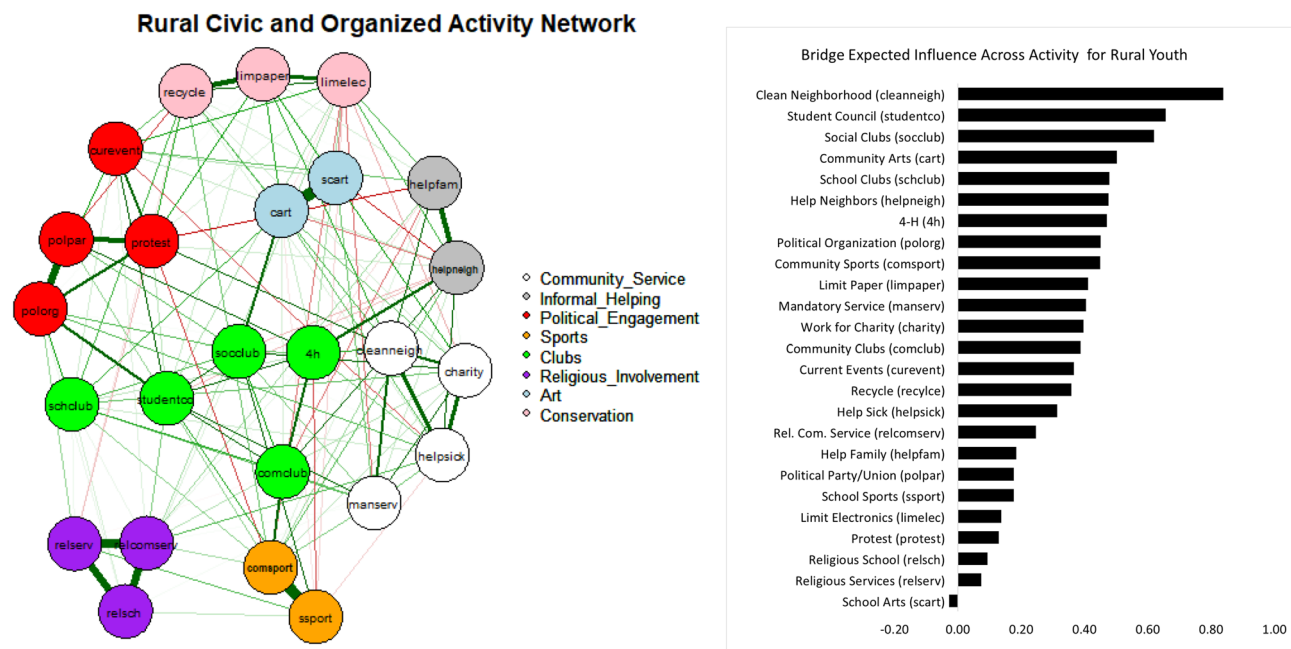Bolded values are significant at $p < 0.05$

Fig. 1 Civic and organized activity network and bridge expected influence for activity network among rural youth. Green (darker) lines represent positive associations and red (lighter) lines represent negative associations. A color electronic copy of the figure is available at https://psyarxiv.com/9jzpg/

youth were most frequently engaged in helping family, school sports, and recycling and involvement in these activities appeared similar across both communities. Further, most organized and civic activities were significantly correlated with one another in each community (rs range: −0.08 to 0.81).

Rural community network structure

Figure 1 displays the rural community network and the BEIs from this network. The overall network density was first examined which represents the sum of all tie strengths in LASSO network. The overall density sum for the rural school activity network was $Density = 22.51$ ($SD = 0.09$). In the rural school network, there were 157 possible connections that were constrained to zero after applying the L1 penalty, leaving 143 non-zero edges. Of these edges, 22 were negative and the remaining 121 were positive. The average corrected partial correlation for the negative edges was $r = −0.04$ and the average corrected partial correlation for the positive edges was $r = 0.10$.

Next, the BEI of each node (Table 5; Fig. 2) in the rural school activity network was explored. Seven activities fell within the upper quartile of BEIs (>0.47). Volunteering to clean up the neighborhood or community provided the highest BEI of the 25 total activities. In other words, volunteering to clean up the neighborhood was more strongly and positively connected to a wider variety of

unique types of other activities within the network after accounting for involvement in all other activities. This was followed by student council, community social clubs, community arts, school clubs, helping neighbors, and 4-H. Eight nodes fell within the lower quartile of BEIs within the rural community (<0.18). School arts demonstrated the lowest BEI among youth in the rural community, indicating that it was least strongly and more narrowly connected with other forms of organized and civic activities. The remaining activities in the lowest BEI quartile for youth in the rural community were participation in school arts, religious school activities, protesting, limiting electricity, school sports, participation in a political organization or union, and helping one's family. Overall, an acceptable level of stability was indicated by the edge weight CS coefficient, CS (cor = 0.7) ≈ 0.75 (Bellet et al. 2018).

Non-rural Community Network Structure

Figure 2 displays the non-rural community network and the BEIs from this network. The overall network density was $Density = 21.44$ ($SD = 0.09$). There were 181 possible connections that were constrained to zero after applying the L1 penalty, leaving 119 non-zero edges. Of these edges, 12 were negative and the remaining 107 were positive. The average corrected partial correlation for the negative edges was $r = −0.04$ and the average corrected partial correlation for the positive edges was $r = 0.10$, which were similar in

Table 5 Comparisons of bridge expected influence for activity networks for youth from a rural and non-rural community

Node Labels	Activity	Bridging expected influence						Rural versus non-rural differences						
		N	Rural	SD	N	Non-rural	SD	Diff	SE	95% CI	t	df	p	d
cleanneigh	Clean neighborhood	21	0.84	0.05	21	0.65	0.05	0.19	0.02	−0.22, −0.16	−12.82	40	<0.001	3.80
studentco	Student council	20	0.66	0.06	20	0.50	0.05	0.16	0.02	0.12, 0.20	9.16	38	<0.001	2.89
socclub	Social clubs	20	0.62	0.06	20	0.64	0.05	0.02	0.02	−0.02, 0.05	1.15	38	0.260	0.36
cart	Community arts	23	0.50	0.05	23	0.37	0.04	0.13	0.01	0.10, 0.16	9.74	44	<0.001	2.87
schclub	School clubs	20	0.48	0.03	20	0.54	0.05	0.06	0.01	0.03, 0.08	4.60	38	<0.001	1.46
helpneigh	Help neighbors	23	0.48	0.07	23	0.54	0.05	0.06	0.02	0.02, 0.10	3.35	44	0.002	0.99
4 h	4-H	20	0.47	0.06	20	0.41	0.06	0.06	0.02	0.02, 0.09	3.16	38	0.003	1.00
polorg	Political org.	21	0.45	0.04	21	0.47	0.04	0.02	0.02	−0.01, 0.05	1.62	40	0.100	0.44
comsport	**Community sports**	**23**	**0.45**	**0.05**	**23**	**0.22**	**0.02**	**0.23**	**0.01**	**0.20, 0.25**	**20.48**	**44**	**<0.001**	**6.04**
limpaper	Limit paper	23	0.41	0.04	23	0.32	0.03	0.09	0.01	0.07, 0.11	8.63	44	<0.001	2.54
manserv	Mandatory service	21	0.40	0.05	21	0.58	0.06	0.18	0.02	0.15, 0.21	10.56	40	<0.001	3.26
charity	Work for charity	21	0.40	0.04	21	0.43	0.03	0.03	0.01	0.01, 0.05	3.24	40	0.002	0.85
comclub	Community clubs	20	0.39	0.06	20	0.42	0.04	0.03	0.02	−0.01, 0.06	1.86	38	0.071	0.59
curevent	Current events	21	0.37	0.04	21	0.23	0.04	0.14	0.01	0.11, 0.17	11.34	40	<0.001	3.50
recycle	Recycle	23	0.36	0.04	22	0.53	0.05	0.17	0.01	0.14, 0.20	12.73	44	<0.001	3.75
helpsick	**Help sick**	**21**	**0.31**	**0.03**	**21**	**0.43**	**0.03**	**0.11**	**0.01**	**0.09, 0.13**	**11.88**	**40**	**<0.001**	**4.00**
relcomserv	Rel com service	22	0.25	0.02	22	0.23	0.02	0.02	0.01	0.01, 0.03	3.32	42	0.001	1.00
helpfam	Help family	23	0.18	0.04	23	0.24	0.03	0.06	0.01	0.04, 0.08	5.76	44	<0.001	1.70
polpar	Political party	21	0.18	0.04	21	0.22	0.03	0.04	0.01	0.03, 0.07	4.58	40	<0.001	1.13
ssport	School sports	23	0.18	0.04	23	0.09	0.04	0.09	0.01	0.06, 0.11	7.63	44	<0.001	2.25
limelec	Limit electronics	22	0.14	0.04	22	0.07	0.03	0.07	0.01	0.04, 0.09	6.57	42	<0.001	1.98
protest	**Protest**	**21**	**0.13**	**0.05**	**21**	**0.35**	**0.05**	**0.22**	**0.02**	**0.19, 0.25**	**14.26**	**40**	**<0.001**	**4.40**
relsch	Religious school	22	0.09	0.01	22	0.09	0.01	0.00	0.01	0.01, 0.01	0.00	42	1.00	0.00
relserv	**Attend rel service**	**22**	**0.07**	**0.02**	**22**	**−0.07**	**0.01**	**0.14**	**0.01**	**0.13, 0.15**	**29.36**	**42**	**<0.001**	**8.85**
scart	**School arts**	**23**	**−0.03**	**0.03**	**23**	**0.21**	**0.02**	**0.24**	**0.01**	**0.22, 0.26**	**31.92**	**44**	**<0.001**	**9.41**

Bolded values denote largest differences (effect size) in bridge expected influence between youth from the rural and non-rural community

strength to the average partial correlations for positive and negative edges within the rural community network.

Exploratory analyses indicate that six nodes fell within the upper quartile of BEIs (>0.52) for the non-rural community network (Table 5; Fig. 2). Similar to youth in the rural community, volunteering to clean up the neighborhood or community provided the highest expected bridging influence of the 25 activities for youth in the non-rural community. Also similar to youth in the rural community, participation in community social clubs, school clubs, helping neighbors were in the upper quartile of expected influence for youth in the non-rural community. In contrast to youth in the rural community, school-mandated community service and recycling were also in the upper quartile. Seven nodes fell within the lower quartile of BEIs within the rural community (<0.22). Participation in religious community service activities had the lowest BEI among youth in the non-rural community and was thus least strongly and more narrowly connected with other activities.

This was followed by limiting electronics, participation in religious school activities, school sports, participation in an organization affiliated with a political party or union, and participation in community sports. An acceptable level of stability was indicated by the edge weight CS coefficient, $CS(cor = 0.7) \approx 0.75$.

Comparing the Rural Community and Non-Rural Community Activity Networks

To test for significant differences in the overall degree of interconnectivity among nodes between the rural and non-rural networks, the network density was compared across networks using a series of independent *t*-tests. Each network contained identical variables, thus density values and BEI values were directly comparable. Confirmatory analyses indicate that the rural community network had a greater overall density (*Density* = 22.31, *SD* = 0.09) compared to the non-rural community network (*Density* = 21.43, *SD* =
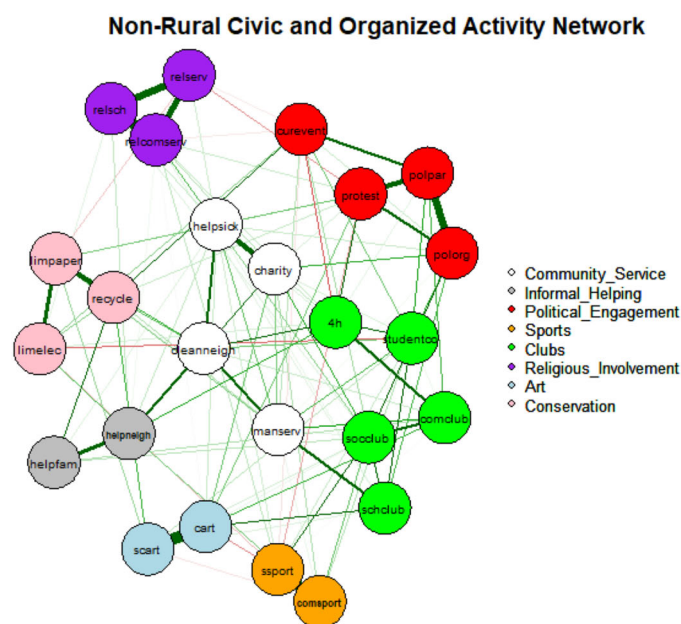
Fig. 2 Civic and organized activity network and bridge expected influence for activity network among non-rural youth. Green (darker) lines represent positive associations and red (lighter) lines represent negative associations. A color electronic copy of the figure is available at https://psyarxiv.com/9jzpg/

0.09; t [598] = −119.75, $p < 0.001$), indicating that activities in the rural community were more strongly and diversely correlated with one another relative to the non-rural community.

To test whether the centrality of certain activities varied by context, independent samples t-tests were used to compare BEIs for each activity across the rural community and non-rural community activity networks. Table 5 displays the magnitude and direction of differences between BEIs across the rural and non-rural community. After applying a False Discovery Rate correction, independent samples t-tests comparing BEIs for 21 of the 25 activities reached statistical significance. Activities that demonstrated the largest differences (Cohen's $d > 4.00$) across communities were thus of central focus, which included school arts, religious service attendance, protesting, volunteering to help the sick and poor, and community sports. Participation in religious service and community sports had higher BEIs for youth in the rural community, suggesting that these activities were more strongly, widely, and uniquely associated with greater involvement in other types of civic and organized activities for youth in the rural community relative to the non-rural community. In contrast, participation in school arts, protesting, and volunteering to help the sick had higher BEIs for youth in the non-rural community, indicating that these activities were more strongly, widely, and uniquely associated with greater involvement in other types of civic and organized activities for youth in the non-rural community relative to youth in the rural community.
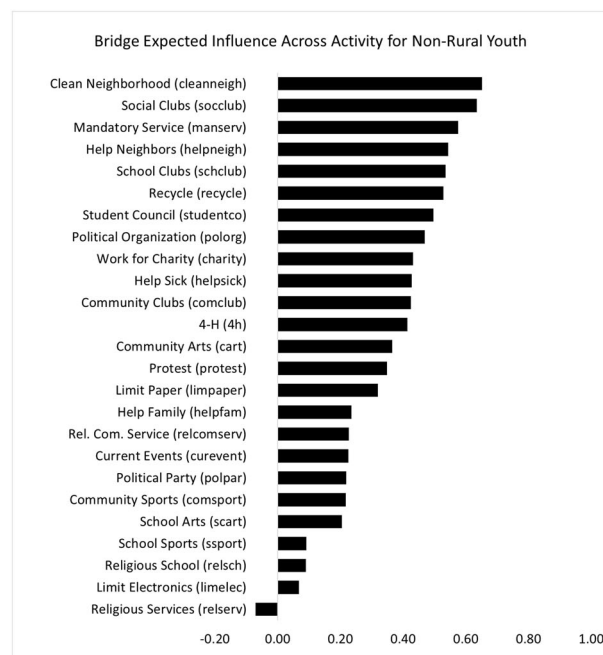
Discussion

Organized and civic activities represent important contexts for positive youth development and engagement in a wider breadth of activity participation can contribute to adolescent health and well-being (Denault and Poulin 2009). Although considerable research has documented systematic connections within and across organized and civic activities, few studies have comprehensively examined the structure of these connections among youth from different types of communities. Network analysis is uniquely positioned to address this gap in the literature by systemically summarizing complex and nuanced associations among a broad array of personal experiences. This study utilized network analysis to examine the structure of organized and civic activity networks and investigated whether network properties varied for youth from a rural and non-rural community. Consistent with ecological systems theories (Neal and Neal 2013), findings indicate that organized and civic activities demonstrate a cohesive network of experiences that are positively and uniquely connected with one another. Activities within these networks varied in their degree of centrality in that some categories of activities were more strongly and diversely connected with other categories of activities, while others were more isolated and less strongly connected. Further, although many aspects of these networks were similar when comparing youth from a rural community with youth from a non-rural community, other properties of these networks, including the overall density

and centrality of some activities, varied across communities. These findings highlight the utility of network analysis for identifying patterns in how civic and organized activities relate in different contexts.

Organized and civic activity networks demonstrated a high amount of similarities across youth from a rural and non-community, particularly with regard to the centrality of specific activities. Consistent with prior research and hypotheses (Oosterhoff et al. 2017b), volunteering to clean up the neighborhood had the highest centrality and was more strongly connected to a diverse array of other activities in the network relative to other activities for youth in both communities. Helping one's neighbors also had a similarly high degree of centrality within both networks after accounting for the effects of all other activities. Connections between organized activities and volunteering may have both structural and motivational components. Some research suggest that organized activity involvement may provide youth with important developmental resources that motivate helping behavior, such as contact with prosocial peers (Darling 2005). Additionally, organized and civic activities may facilitate opportunities to engage in formal volunteer experiences such as cleaning up the neighborhood or informally helping one's neighbor. Alternatively, volunteering or helping one's neighbor may connect youth with others who are actively involved in organized activities and thus serve as a junction for recruiting youth into other school and community activities.

Similarly, participating in social clubs, school clubs, and student council also had high centrality across the rural community and non-rural community networks compared to other activities. The centrality of social and school clubs may be due to the diverse array of activity experiences offered across these broad categories. For instance, school and social clubs may include content that is largely incorporated into other forms of organized activities, such as arts, conservation, or politics. From this perspective, some school or social clubs may represent an extension or additional form of engagement for other activities. Student council also demonstrated a large degree of centrality across networks. It is possible that youth from a wide range of other organized activities seek placement on student council as a means of representing or advocating for their team or group. In many schools, student council representatives are elected by the student body. Youth who are more involved in organized activities are often rated as more popular (Eder and Kinney 1995) and thus may be more likely to be elected to student council. Being involved in a diverse array of organized activities may therefore increase the likelihood of youth participating in student council. Alternatively, youth who become involved in student council may seek out other organized activities as a means of becoming more involved in their school and more connected with the student body they represent.

Although more central activities (i.e., those with a wider breadth of stronger, unique connections with other activities) were generally similar across communities, there were theoretically important and consistent community differences in the centrality of specific activities across the two communities. Specifically, participation in religious service and community sports were more central to the rural community activity network relative to non-rural community network. Religious organizations are thought to serve an important role in connecting individuals within a rural community and thus may serve as a larger "hub" within rural contexts relative to non-rural contexts (Elder and Conger 2000). Although less research has examined community sports among rural youth (Ferris et al. 2013), organized sports in general are central to the health, well-being, and identity of rural communities (Townsend et al. 2002). Community sports may serve as a means of further connecting rural youth to other organized and civic activities within rural communities.

Involvement in school arts and volunteering to help the sick or poor were more central to activity networks for the non-rural community compared to the rural community, with the largest difference found for school arts. Further examination of the non-rural activity network indicates that greater network centrality for school arts may be due to connections with conservation behaviors (i.e., recycling and limiting paper use) as well as involvement in community clubs. Greater centrality of volunteering to help the sick and poor in the non-rural community network may be due to stronger connections with conservation behaviors and school arts. Involvement in school arts, volunteering to help the poor, and conservation behaviors potentially share similar iconoclastic motives (e.g., Oosterhoff et al. 2017a). Youth who participate in these activities may seek to contribute to their communities in creative and sometimes challenging ways, which leads to greater involvement in arts and volunteering to help the poor. These activities may also be more common and available in non-rural areas, thus limiting access barriers that dampen associations between these activities in rural communities (Levinson et al. 2010). Similarly, non-rural communities may offer opportunities to engage in community clubs that have an arts theme or component, resulting in stronger connections between arts and community clubs.

Protesting was also more central to activity networks in non-rural community versus rural community. Inspection of the network graphs suggests that although protesting is negatively associated with 4-H and religious community service in rural community, it is positively associated with these activities in non-rural community. Although further research is needed to fully elucidate these findings, it is possible that the norms and values emphasized in religious community service and 4-H vary across rural and non-rural

communities which produce different patterns of associations between these activities. Political protests constitute an alternative or social movement form of political involvement aimed at changing social policy, which may contrast more sharply with conventional religious or community norms in rural contexts. It is also possible that youth in non-rural communities have greater opportunities to protest, which may increase the likelihood of detecting connections with other activities.

Consistent with hypotheses, overall network density varied across the rural community and non-rural community networks, with the rural community network having a slightly stronger network density relative to non-rural community network. Inspection of network properties indicates that although the average edge strength (i.e., average partial correlation) was highly similar across networks, the rural community network had a greater number of significant edges (connections) relative to the non-rural community network. Potentially, organized and civic activities in rural communities are more diversely connected relative to organized and civic activities in non-rural communities. Theory concerning rural context proposes that youth are involved in a wider array of organized activities in rural areas, possibly due to less competition, having activities leaders that serve multiple roles across activities, and recruiting youth to participate in multiple activities to help fill rosters and minimum quotas (Elder and Conger 2000). These differences across rural and non-rural communities may explain differences in organized and civic activity network density.

Implications for Theory and Practice

Findings from this study have important implications for theory and practice. Theoretically, this study demonstrates the utility of applying network analysis to summarizes complex relations in a broad array of personal experiences and identify meaningful patterns. Applying this approach to organized and civic activity involvement sheds new light on structural aspects of youth's extracurricular ecology and the systematic co-occurrence of different activities. Network analysis extends information gained from descriptive statistics (e.g., means, bivariate correlations) by identifying activities that are more central to youth's networks and serve as hubs for their frequent and strong connections with other activities. Isolating these activities provides novel insight into how and why organized and civic activities co-occur, which is important for accurately understanding and modeling their effect on adolescent development.

Findings also extend theory by highlighting the importance of considering community context when examining the structure, coherence, and integration of organized and civic activity involvement. Developmental theory has stressed the importance of community context for adolescent development, yet this perspective is rarely tested empirically. Results from this study contribute to a growing body of evidence highlighting the importance of incorporating community context into models of organized and civic activity involvement (e.g., Ferris et al. 2013; Ludden 2011). Importantly, rural and non-rural differences in the centrality of specific activities appear more prominent among civic or community behaviors (i.e., religious community service, volunteering to help the poor, protesting, community sports) relative to more traditional conceptualizations of extra-curricular activities, with the exception of school arts. This pattern intriguingly suggests that civic activities may be more contextually sensitive relative to more traditional forms of organized activities, which might having greater generalization across contexts. Additionally, the higher density of network connections for youth from the rural community raises questions about whether there is a stronger dichotomy among youth who are uninvolved in activities versus multiply involved. It is possible that in rural areas, structural barriers (e.g., household distance from school or the community) provides some youth extremely limited access to organized and civic activities, yet those who do have access may have greater opportunities to become multiply involved.

Findings also have implications for youth community programs. For instance, community organizers may benefit from using network analysis to identify activities that are central to youth's networks and serve as hubs to connect youth with other ecological assets as a means of cultivating positive youth development. Recruiting youth to become involved in these central activities may facilitate a greater breadth of activity involvement and thus serve as a gateway for providing youth with important developmental resources. Community organizations may also seek to investigate why certain activities are less central to youth's network and consider targeting and strengthening ties among these activities by encouraging cross-involvement. Facilitating stronger connections across activities may increase the likelihood that youth become involved in wider breadth of activities, thus promoting their health, well-being, and long-term civic involvement.

Limitations and Future Directions

Findings should be interpreted in light of certain limitations. Data were cross-sectional and causal interpretations cannot be made. Longitudinal research is needed to help document how activity networks are connected across time. Although reflective of many rural areas in the U.S., both samples were primarily White and future research is needed to examine these networks with a more racially and ethnically diverse sample. The assessment of activity involvement in this

study incorporated a wide range of activities. A particular strength of this assessment was the differentiation between school and community contexts and including an expanded array of civic activities. However, some items were necessarily broad (e.g., social clubs, sports), and coded, free-response assessments of activity involvement may provide a more detailed assessment of involvement. Such assessments may be especially important for sports involvement given the high degree of heterogeneity specific sport types. This study also raises important questions regarding whether certain forms of organized and civic activities share common features or whether certain forms of engagement possibly motivates or facilitates greater involvement in other forms of engagement. Given that the benefits of activity can be higher for youth who engaged in a wider breadth of involvement, identifying the temporal sequence within and between organized and civic activities may further knowledge of how and why some youth become multiply involved. Additionally, future research may also benefit from considering how organized and civic network characteristics may vary for youth from different demographic backgrounds. For instance, prior research has consistently demonstrated gender differences in the frequency and benefits of organized and civic activity involvement (e.g., Ferris et al. 2013). It is possible that the density of organized and civic activity networks and the centrality of specific may differ for adolescent boys and girls.

This study has two notable potential constraints on generalization. The first constraint concerns the extent to which the sample recruited from each school represented the general student body. This study recruited youth enrolled in social study courses at the time of data collection and only enrolled students who returned parent permission forms and provided written assent. For the school in the rural community, sample participants represented approximately 58 percent of the student body and for the school in the non-rural community, sample participants represented approximately 25 percent of the study body. Although the sample demographic characteristics reflected the school-level demographic characteristics, it is unclear if the samples are generalizable to the school student population with regards to unmeasured variables or to unknown school-level characteristics (e.g., activity involvement).

Additionally, it is unclear whether findings are specific to the two communities assessed in this study or whether they can generalize to other rural or non-communities. The two communities used in this study were recruited due to their differences in rurality, but they also differed on other characteristics that tend to co-occur in rural areas including school size, racial/ethnic diversity, and percentage of free and reduced lunch within the student body. Simultaneously, effect sizes found in this study were relatively small and although the two samples in this study varied on certain

characteristics, these difference were still modest. It is possible that specific school or community characteristics explain the similarities or differences found in this study. Future research is needed to examine activity network structures among a wider range of communities (e.g., rural, suburban, urban) and also document the specific characteristics of these communities that may explain possible variation in network structure.

Conclusion

Involvement in organized and civic activities is important for positive youth development, and participation in a wider breadth of activities in heathy contexts can enhance youth's health and well-being. Activity involvement tends to co-occur among youth, yet little research has tested the interconnections between activities and whether these links vary across different communities. Understanding the complex interconnections among activities advances theory and research by elucidating possible means to leverage the structure of activities to increase overall involvement among youth. Utilizing these networks further allows community organizers to identify activity "hubs" that may serve to connect youth to a wider variety of other organized or civic activities. Comparisons of network structures for youth from a rural and non-rural school highlights the importance of considering community context within models of positive youth development. Future research should continue to investigate the complex intersection among organized and civic activities and utilize this knowledge to help youth build networks of community resources.

Compliance with Ethical Standards

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