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Cohesive Neighborhoods Where Social Expectations Are Shared May Have Positive Impact On Adolescent Mental Health

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Abstract

Adolescent mental health problems are associated with poor health and well-being in adulthood. This study uses data from a birth cohort of children born in large U.S. cities (N=2,264) to examine whether neighborhood collective efficacy (social cohesion and control) is associated with improvements in adolescent mental health. We find that children who grow up in high collective efficacy neighborhoods experience fewer depressive and anxiety symptoms during adolescence than similar children from low collective efficacy neighborhoods. The magnitude of this neighborhood effect is comparable to the effects of depression prevention programs. Findings do not vary by family or neighborhood income, indicating that neighborhood collective efficacy supports adolescent mental health across diverse populations and urban settings. We recommend greater emphasis on neighborhood environments in individual mental health risk assessments and greater investment in community-based initiatives that strengthen neighborhood social cohesion and control.

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Introduction

Adolescent mental health problems are a strong predictor of future health and wellbeing, including suicide attempts, substance dependence, educational underachievement, unemployment, and early parenthood (1,2). Understanding how community environments influence adolescent mental health is therefore important to health and wellbeing throughout the life course. Research has documented wide health disparities across U.S. counties and metropolitan areas (3), and a strong link between neighborhood socio-economic characteristics and children's wellbeing (4–6). Less is known, however, about the social and institutional processes through which place of residence influences children's development (7,8). One potential mechanism is neighborhood collective efficacy. Collective efficacy theory joins two social processes: social cohesion, the extent to which residents get along and share common values (the “collectivity” component); and shared expectations for social control, the extent to which neighbors can be counted on to take action when everyday challenges arise (the “efficacy” component) (9).

Neighborhood mechanisms of social cohesion and control are expected to empower communities to solve common problems. In particular, collective efficacy theory was developed to explain differences in neighborhood crime (10). Communities where residents share similar values about local norms and intervene when these norms are violated (e.g., children fighting on the street) are believed to collectively discourage violent and delinquent behavior. Thus, related empirical work on child development has primarily focused on juvenile delinquency and risky health behaviors (e.g., aggression, rule-breaking, multiple sexual partners). As hypothesized, these studies have shown that neighborhood collective efficacy is associated with fewer problem behaviors net of individual, family, and neighborhood socio-demographic characteristics (11–14).

Neighborhood collective efficacy is also expected to support individual mental health: directly, through social support, solidarity, and trust shared among community members (15,16); and indirectly, through reduction of violent and delinquent behaviors that are stressful to neighborhood residents. However, little research has focused on whether neighborhood collective efficacy protects against adolescent depression and anxiety. This limitation is noteworthy, given that 14% of adolescents in the U.S. have experienced a depression/mood disorder and 8% have experienced an anxiety disorder with severe impairment (17).

Prior research on neighborhood collective efficacy and children's mental health is based on a small number of studies that are geographically limited. Most notably, the Project on Human Development in Chicago Neighborhoods (PHDCN) conducted an intensive study of Chicago neighborhoods followed by a series of longitudinal studies of children and families. Joining data from these studies, researchers found that young children from neighborhoods with higher levels of collective efficacy experienced fewer parent-reported internalizing behaviors (depression, anxiety, withdrawal, and somatic problems), controlling for neighborhood socio-economic conditions and children's earlier internalizing behaviors (18). In a related PHDCN study, neighborhoods with high collective efficacy increased the protective effect of family support on adolescent suicidal behaviors (19). Beyond Chicago, one prospective

study of children in Baltimore also found that neighborhood collective efficacy was associated with fewer parent-reported internalizing behaviors, but only in low-income communities (20). However, given the single-city design of these studies, the extent to which findings can be generalized to other places and populations remains in question.

In this study, we use data from twenty large U.S. cities to examine how childhood exposure to neighborhood collective efficacy is related to symptoms of adolescent depression and anxiety. We test whether associations vary by characteristics previously shown to moderate neighborhood effects, including family income, child gender, and neighborhood disadvantage (7,11,20). The study design adopts a life course perspective (21), whereby cumulative social support experienced throughout childhood influences health outcomes during the transition to adulthood (22). To our knowledge, ours is the first study of adolescent mental health to measure neighborhood collective efficacy over time and use population-based data on children from multiple cities.

Data and Methods

Data

The Fragile Families and Child Wellbeing Study (FFCWS) is a population-based, birth cohort study of approximately 4,800 children born in large U.S. cities between 1998 and 2000. The study sampled births (one per household) in twenty cities from all regions of the U.S. (23). The design called for an oversample of births to unmarried mothers, which resulted in a large sample of children from low-income families. Mothers were first interviewed at the hospital following the birth of their child; follow-up interviews with parents and children were conducted when children were approximately ages 1, 3, 5, 9, and 15.

The analytic sample in this study includes 2,264 children who evaluated their mental health at age 15 and whose parents assessed neighborhood collective efficacy when children were ages 3, 5, and 9. The analytic sample is socio-demographically comparable to the sample of families interviewed at birth with one notable exception. Due to the disproportionate attrition of immigrant families, the analytic sample has a smaller percentage of Hispanic families and low educated mothers than the baseline sample (Appendix A compares all characteristics) (24).

Adolescent mental health

Adolescents reported the severity of their depressive and anxiety symptoms when they were age 15. Measuring symptom severity on a continuum from none to severe, rather than a binary measure of clinical diagnosis, is supported by research that links subthreshold depression and anxiety commonly experienced during adolescence and increased disease and suicide in adulthood (25).

The depressive symptoms scale is based on five items taken from the twenty-item Center for Epidemiologic Studies Depression Scale (CES-D) (26). As compared with the full scale, the five-item scale is a more valid cross-cultural assessment of depressive symptoms experienced across diverse adolescent populations (27). Referencing the previous four

weeks, respondents indicated their level of agreement on a four-point scale to the following statements: “I feel I cannot shake off the blues, even with help from my family and my friends”; “I feel sad”; “I feel happy” (reverse coded); “I feel life is not worth living”; “I feel depressed”(α=.75).

The anxiety symptoms scale is comprised of six items adapted from the Brief Symptom Inventory 18 (BSI 18) (28). Respondents indicated their level of agreement on a four-point scale to the following statements in reference to the past four weeks: “I have spells of terror or panic”; “I feel tense or keyed up”; “I get suddenly scared for no reason”; “I feel nervous or shaky inside”; “I feel fearful”; and “I feel so restless I can't sit still” (α=0.76).

Neighborhood collective efficacy

Parents evaluated neighborhood collective efficacy when children were ages 3, 5, and 9 on two sub-scales adapted from earlier research (29). The first sub-scale assessed neighborhood social cohesion based on respondent's level of agreement on a four-point scale to: “People around here are willing to help their neighbors”; “This is a close-knit neighborhood”; “People in this neighborhood generally don't get along with each other” (reverse coded); and “People in this neighborhood do not share the same values” (reverse coded). The second sub-scale assessed neighborhood social control based on the respondent's expectation on a four-point scale of the likelihood that neighbors would “intervene” or “get involved” if “children were skipping school and hanging out on the street”, “children were spray painting buildings with graffiti”, “children were showing disrespect to an adult”, “a fight broke out in front of the house”, and “the fire station closest to the neighborhood was threatened and its budget cut”.

Following prior research (18), the two correlated sub-scales (r=0.63) are combined into a single measure of neighborhood collective efficacy. At each wave, all nine items are summed to create a composite index of neighborhood collective efficacy (α=0.86 across three waves). We use the mean of the three wave-specific composite indices to construct an overall measure of children's cumulative exposure to neighborhood collective during early and middle childhood (between ages 3 and 9) (30).

Control variables

At the neighborhood level, we construct an index of neighborhood socio-economic disadvantage that includes seven highly correlated, Census tract indicators of concentrated disadvantage: percent of residents who are poor, unemployed, receiving welfare, without a high school degree, with a Bachelor's degree (reverse coded), percent of workers with professional/managerial occupations (reverse coded), and percent of households headed by a female (31). Census tract data from the 2000 Census and the 2005-2009 American Community Surveys are linearly interpolated across calendar years and merged to respondents' residence at each wave. The index corresponds to mean levels of disadvantage children experienced between ages 3 and 9, standardized to a mean of 0 and a standard deviation of 1 across the national distribution of all U.S. Census tracts (32).

At the household level, we also control for the average annual household income at ages 3, 5 and 9 (logged) and the number of residential moves between ages 3 and 9. Additional

control variables measured at birth include: number of children in household, relationship between biological parents (married, cohabiting, single), and mother's education, race/ethnicity, immigrant status, and age. All models also include controls for child gender and age at the mental health assessment.

Finally, we control for the mental health history of children, parents, and grandparents. At age 3, parents assessed children's anxious and depressed behaviors based on 11 survey items from the Anxious/Depressed sub-scale of the Child Behavior Checklist (33) (α=0.69). At ages 1 and 3, we also measured whether children's mothers met clinical thresholds for a Major Depressive Episode (MDE) and Generalized Anxiety Disorder (GAD) over the previous year; both measures are derived from the Composite International Diagnostic Interview - Short Form (34). Measures of maternal grandmother's mental health include symptoms of depression and anxiety based on survey questions from the National Comorbidity Survey (35); at age 3, the child's mother reported whether her biological mother ever had periods “lasting two weeks or more when she was depressed, blue, or down in the dumps most of the time?”, and “of a month or more when she was constantly nervous, edgy, or anxious?”.

Analyses

Statistical analyses estimate associations between children's exposure to neighborhood collective efficacy (measured at ages 3, 5 and 9) and adolescent mental health (measured at age 15) using ordinary least squares regression (OLS) and controlling for the socio-demographic and mental health history variables discussed above. Models also include fixed-effects for the city in which children were born (range of 46 to 189 children per city). Sub-group estimates are obtained by interacting sub-group variables with neighborhood collective efficacy. Missing information on control variables are imputed using multiple imputation by chained equations (M=40) (36).

Limitations

This study presents associations between parents' reports of neighborhood collective efficacy and adolescents' self-assessment of their mental health. Several noteworthy limitations should be considered when interpreting these findings.

First, unlike an experimental study, non-random assignment of families into neighborhoods limits our ability to identify causal effects. Because families have some choice in where they live, associations between neighborhood characteristics and individual outcomes are particularly vulnerable to selection biases (37). Therefore, we cannot rule out the possibility that associations presented are due to unobserved characteristics of families or communities, rather than the causal effect of neighborhood collective efficacy.

Second, our measure of neighborhood collective efficacy is based on parents' assessments, rather than a more objective measure of neighborhood quality. As a result, neighborhood ratings may be affected by reporter characteristics unrelated to the neighborhood environment. In some prior studies, collective efficacy has been measured by aggregating reports from a diverse sample of neighborhood residents and adjusting ratings based on

reporter characteristics (18). Unfortunately, these methods were not possible in this study because families were not sufficiently clustered within small geographical units that could proxy for neighborhood boundaries. For example, the average number of respondents per Census tract at each wave was less than 1.3; only 2% of respondents within the analytic sample shared the same Census tract residence with another respondent at ages 3, 5 and 9.

In order to mitigate these limitations, we use different reporters for neighborhood collective efficacy and adolescent mental health (parents and adolescents, respectively). We also control for a wide range of individual and neighborhood socio-demographic characteristics, including the mental health histories of children, parents, and grandparents. Our findings are robust to a variety of alternative measurement and model specifications, including a count measure of the number of waves children resided in high collective efficacy neighborhoods (Appendix B) and the regression of scale scores using negative binomial regression models (Appendix C) (24).

Results

Description of variables

Exhibit 1 presents descriptive statistics of all variables used in this study. At age 15, children report mean levels of depressive symptoms of 2.98 on the adapted CES-D scale (range of 0 to 15) and mean levels of anxiety symptoms of 4.88 on the adapted BSI 18 scale (range of 0 to 18). Parents report average levels of neighborhood collective efficacy of 18.3 on the scale ranging from of 0 to 27 (slightly above a 3 on a 4-point scale of agreement) with a standard deviation of 4.5.

On average, children in the analytic sample are from disadvantaged socio-demographic backgrounds. They grow up in neighborhoods that are two thirds of a standard deviation above the national mean on the neighborhood socio-economic disadvantage scale and in households with an average annual household income of $41,000. Nearly a third of the mothers have less than a high school degree (30%), half are African American, and around one quarter are Hispanic (23%). Approximately 74% of children were born to unmarried mothers (mean age of 25.3).

Factors affecting adolescent mental health

We conducted a series of nested OLS regression models predicting levels of adolescent depressive and anxiety symptoms, first using only collective efficacy (averaged over ages 3, 5 and 9) as a predictor (Model 1), then adding socio-demographic variables (Model 2), and finally adding mental health history variables (Model 3). To ease interpretation, the depressive and anxiety scales are standardized to a mean of 0 and standard deviation of 1; thus, results are standardized to show the effect on depressive and anxiety symptoms (relative to the standard deviation) of a one unit change in the individual covariates. Full model results are available for both outcomes in Appendix D and E (24).

In the bivariate models, one standard deviation change in collective efficacy was associated with a 0.11 and 0.10 standard deviation reduction in depressive and anxiety symptoms, respectively ($p<0.01$ for both outcomes). For both outcomes, this association was attenuated

but remained statistically significant after socio-demographic and mental health history variables were added to the models.

Exhibit 2 presents selected results from the full model specifications. Net of all socio-demographic and mental health history variables, one standard deviation change in collective efficacy is associated with a decrease in both depressive and anxiety symptoms of 0.07 standard deviations ($p<.01$ for both outcomes). These associations can be translated into effect sizes comparable to treatment evaluations. For example, adolescents who grow up in a high collective efficacy neighborhood (75th percentile in sample) report 0.10 of a standard deviation less depression and anxiety than comparable adolescents who grow up in low collective neighborhoods (25 percentile in sample) (38). This standardized mean difference is comparable in size to the effects of prevention programs aimed at general or at-risk adolescent populations (39).

In the full model specifications, neighborhood socio-economic disadvantage is not predictive of adolescent depression or anxiety. Household income is associated with less of both symptoms ($p<.05$ and $p<.10$, respectively) and female adolescents report substantially more symptoms of depression (0.20 standard deviations, $p<.01$) and anxiety (0.12 standard deviations, $p<.01$) than male children. Maternal depression and early childhood anxious/depressed behaviors are both associated with more symptoms of adolescent mental health problems. Adolescents whose mothers were depressed during childhood report levels of depressive and anxiety symptoms that are 0.10 and 0.13 standard deviations higher than comparable adolescents whose mothers were not depressed ($p<0.10$ and $p<.05$, respectively). One standard deviation increase in anxious/depressed behaviors during early childhood is associated with a 0.05 and 0.07 standard deviation increase in adolescent depression and anxiety, respectively ($p<.05$ for both outcomes).

Results by sub-groups

Exhibit 3 shows the estimated effects of neighborhood collective efficacy on adolescent mental health by neighborhood socio-economic disadvantage, household income, and child gender. Marginal effects are estimated from models that interact neighborhood collective efficacy with sub-group variables, controlling for all variables shown in Exhibit 1, including city of birth. Results compare the estimated neighborhood collective efficacy effect between male and female children, children from low- and moderate-income families, and children from neighborhoods of average and disadvantaged socio-economic status (one standard deviation more disadvantaged than the average U.S. neighborhood).

Overall, higher levels of neighborhood collective efficacy are associated with lower levels of adolescent depression and anxiety for all sub-groups analyzed. For both outcomes, the fully standardized associations range from around -.05 to -.09 across sub-groups, similar in magnitude to the -.07 association found for the full sample (Exhibit 2). The interacted models indicate that none of the sub-group differences in associations presented in Exhibit 3 are statistically significant (nor when all interactions are estimated in a single model).

Discussion

Findings from this study show that children who grow up in neighborhoods with higher levels of collective efficacy experience lower levels of depressive and anxiety symptoms during adolescence, even after controlling for a wide variety of socio-demographic and mental health history variables. We estimated that adolescents from high collective neighborhoods report 0.10 of a standard deviation fewer depressive and anxiety symptoms than comparable adolescents from low collective neighborhoods. Although a 0.10 standardized mean difference is notably smaller than an effect size (e.g., 0.50) commonly reported for many psychological and pharmacological interventions aimed at adolescents diagnosed with clinical disorders (40,41), this estimate is similar to the average effect size of prevention programs aimed at general or at-risk adolescent populations (39). Moreover, our estimate of effect size is similar to well-established individual risk factors, such as family depression and child behavioral problems.

Finally, our findings provide evidence that the protective effects of neighborhood collective efficacy reported in previous studies for particular cities extend to diverse populations and urban settings throughout the U.S. Results from this study also show that associations between neighborhood collective efficacy and adolescent mental health hold regardless of neighborhood socio-economic disadvantage, household income, and child gender.

Although our findings can be generalized to a broader population than prior studies, we cannot rule out the possibility that the associations we observe are at least partially spurious. In order to rule out that possibility, experimental research involving neighborhood level interventions is needed. Replication of this observational study using additional analytic methods, such as statistical matching or marginal structural models, would provide evidence on the robustness of these findings. Our findings are also limited by our measure of neighborhood collective efficacy, which is based on reports by children's parents averaged over three time points between ages 3 and 9. Future studies are needed that examine trajectories in children's exposure to neighborhood conditions from birth through adolescence. We also recommend that research doing population studies conduct supplemental community surveys or adopt geographical cluster sampling designs in order to develop more objective measures of neighborhood social processes.

Our findings have several important implications for policy. First, we find that neighborhood collective efficacy is an important predictor of adolescent mental health. Thus, we recommend that neighborhood collective efficacy be used alongside other known ecological risk and protective factors when assessing the mental health risks of individuals. Second, insofar as the associations we observe are causal, we recommend greater policy efforts to strengthen neighborhood social cohesion and control, especially in disadvantaged communities where residents are at increased risk for poor health. Promising strategies to increase neighborhood collective efficacy include adolescent-centered health education programs that focus on empathy and communication (42), and police policies that focus on community collaboration, trust, and relationship building (43). More broadly, prior research highlights reciprocal links between neighborhood collective efficacy, concentrated disadvantage, and the density of and participation in community-based organizations (9).

Therefore, polices that promote greater socio-economic integration and increase investments in community organizations may improve neighborhood collective efficacy and ultimately adolescent mental health.

In conclusion, this study demonstrates that neighborhood collective efficacy is associated with adolescent depression and anxiety. While more research is needed to confirm a causal link, robust associations observed across many cities and demographic sub-groups add to growing evidence that neighborhood social processes influence child health and well being. Given these findings, we recommend that health practitioners consider the collective efficacy of neighborhoods when evaluating adolescent risk for depression and anxiety. Finally, policies that invest in community organizations and strengthen partnerships between residents and local institutions are likely to simultaneously support neighborhood collective efficacy and adolescent mental health.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Notes

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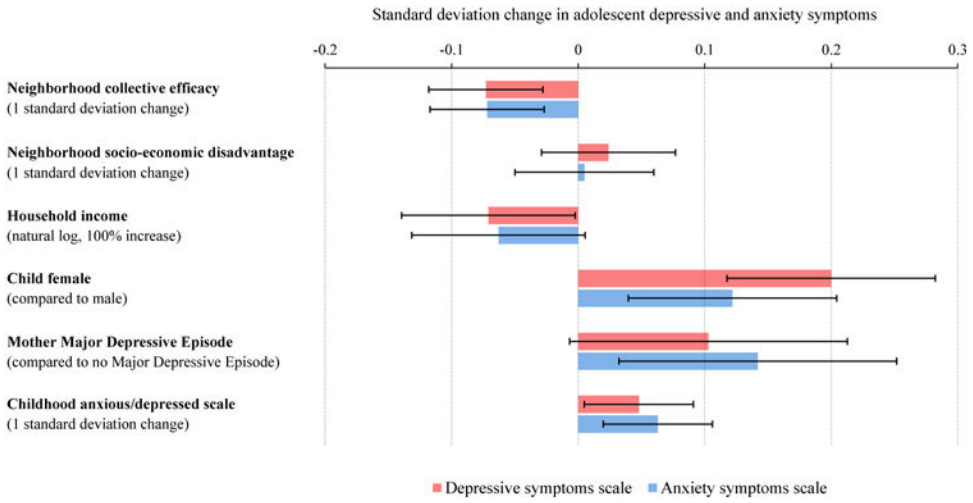

Exhibit 2. Factors affecting adolescent depressive and anxiety symptoms

Source: Authors' analysis of data from the Fragile Families and Child Wellbeing Study. Notes: Results of full model specification predicting adolescent depressive and anxiety symptoms with 95% confidence intervals (full results available in Appendix E and F). Models control for all socio-demographic and mental health history variables present in Exhibit 1, including sample city at birth. Results show the effect on depressive and anxiety symptoms (relative to the standard deviation) of a one unit change in the individual covariates. Units are shown in parentheses.

Exhibit 1
Descriptive statistics of analytic variables

	Reference time period	Mean/frequency	Standard deviation	Range
Dependent variables				
Depressive symptoms scale	15	2.98	2.98	[0, 15]
Anxiety symptoms scale	15	4.88	3.89	[0, 18]
Neighborhood variables				
Collective efficacy scale	3 to 9	18.30	4.52	[2.33, 27.00]
Socio-economic disadvantage scale	3 to 9	0.67	1.10	[-2.06, 4.71]
Socio-demographic control variables				
Annual household income (dollars)	3 to 9	41,367	43,064	[868, 583,333]
Household residential moves	3 to 9	2.33	2.09	[0, 10]
Children in household	Birth	1.25	1.29	[0, 7]
Mother relationship to father				
Married	Birth	.26		[0, 1]
Cohabiting	Birth	.36		[0, 1]
Other	Birth	.39		[0, 1]
Mother education				
Less than high school	Birth	.30		[0, 1]
High school degree	Birth	.31		[0, 1]
Some college	Birth	.27		[0, 1]
College degree	Birth	.12		[0, 1]
Mother race/ethnicity				
White, non-Hispanic	Birth	.23		[0, 1]
Black, non-Hispanic	Birth	.50		[0, 1]
Hispanic, any race	Birth	.23		[0, 1]
Other race, non-Hispanic	Birth	.04		[0, 1]
Mother foreign born	Birth	.12		[0, 1]
Mother age (years)	Birth	25.30	6.07	[14.00, 47.00]
Child female	Birth	.48		[0, 1]
Child age (years)	15	15.46	0.56	[14.40, 17.88]
Mental health control variables				
Mother mental health				
Major Depression Episode	Birth to 3	.23		[0, 1]
Generalized Anxiety Disorder	Birth to 3	.07		[0, 1]
Maternal grandmother mental health				
Depressive symptoms	Before 3	.30		[0, 1]
Anxiety symptoms	Before 3	.18		[0, 1]
Childhood anxious/depressed scale	3	5.40	3.23	[0, 19]

Source: Authors' analysis of data from the Fragile Families and Child Wellbeing Study. Notes: The reference time period corresponds to the approximate age of the focal child in years.

Exhibit 3

Marginal effects of neighborhood collective efficacy on adolescent depressive and anxiety symptoms by sub-groups

	Depressive symptoms scale	Anxiety symptoms scale
By neighborhood socio-economic disadvantage		
High (1 standard deviation above national mean)	-.070 (.023) **	-.075 (.023) **
Average (national mean)	-.089 (.029) **	-.057 (.029) *
Difference	.019 (.020)	-.018 (.020)
By family income		
Low (100% federal poverty line)	-.075 (.024) **	-.081 (.024) **
Moderate (300% federal poverty line)	-.079 (.029) **	-.057 (.029) *
Difference	.005 (.023)	-.024 (.023)
By child gender		
Female	-.081 (.032) *	-.095 (.052) **
Male	-.066 (.030) *	-.052 (.030) +
Difference	.016 (.042)	.043 (.042)

Source: Authors' analysis of data from the Fragile Families and Child Wellbeing Study. Notes: Marginal effects for each sub-group are obtained by interacting sub-group variables with the neighborhood collective efficacy scale. Continuous variables are used for neighborhood disadvantage (national z-score) and family income (income-to-needs ratio); marginal effects are estimated at the values shown in parentheses. Models control for all socio-demographic and mental health history variables present in Exhibit 1, including sample city at birth.

+ p<.10

* p<.05

** p <0.01