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ORIGINAL ARTICLE

Ecological Correlates of Depression and Self-Esteem in Rural Youth

Paul R. Smokowski · Caroline B. R. Evans · Katie L. Cotter · Shenyang Guo

Abstract The current study examines individual-, social-, and school-level characteristics influencing symptoms of depression and self-esteem among a large sample ($N = 4{,}321$) of U.S. youth living in two rural counties in the South. Survey data for this sample of middle-school students (Grade 6 to Grade 8) were part of the Rural Adaptation Project. Data were analyzed using ordered logistic regression. Results show that being female, having a low income, and having negative relationships with parents and peers are risk factors that increase the probability of reporting high levels of depressive symptoms and low levels of self-esteem. In contrast, supportive relationships with parents and peers, high religious orientation, ethnic identity, and school satisfaction increased the probability of reporting low levels of depressive symptoms and high levels of self-esteem. There were few school-level characteristics associated with levels of depressive symptoms and self-esteem. Implications are discussed.

Keywords Depression · Self-esteem · Adolescence · Rural · Native American

P. R. Smokowski · C. B. R. Evans (✉) · K. L. Cotter · S. Guo
North Carolina Academic Center for Excellence in Youth Violence Prevention, University of North Carolina at Chapel Hill, Chapel Hill, NC, USA
e-mail: crobert8@email.unc.edu

P. R. Smokowski
e-mail: smokowsk@email.unc.edu

P. R. Smokowski
School of Social Work, University of North Carolina at Chapel Hill, CB # 3550, 325 Pittsboro Street, Chapel Hill, NC 27599-3550, USA

Adolescence is a developmental period marked by intense physical and psychological growth [1]. Adolescents not only face a hailstorm of new and exciting experiences, changing hormones, and burgeoning autonomy, but also encounter a variety of risk factors that increase their vulnerability. Specifically, mental health is an area of critical adolescent vulnerability because many problems, such as depression, have roots in adolescence [2] and may continue with serious, enduring consequences. Moreover, although depression is the most common mental health disorder among the U.S. adolescent population [3], research has not clearly illuminated the interrelationships of personal and environmental characteristics that contribute to depressive symptoms in adolescents from ethnically diverse, rural communities.

A recent national survey of U.S. adolescents found that 8.1 % of adolescents have suffered from a Major Depressive Episode in the past year [4]. The dangers of childhood and adolescent depression include decreased psychosocial and academic functioning and an increased risk for substance abuse and suicide [5]. In addition, researchers have reported a connection between depression and self-esteem, with high levels of depression often co-occurring with low levels of self-esteem [6–8]. Low self-esteem has been linked to aggressive, antisocial, and delinquent behavior [9] as well as problems that persist into adulthood such as poor physical and mental health, economic problems, and criminal behavior [10].

Although there is a significant body of research that examines the pathogenesis of adolescent depression and correlates of adolescent self-esteem, this literature generally focuses on urban and suburban populations to the exclusion of rural youth. The risk factors and stressors present in rural life [11] may serve to increase adolescent vulnerability, especially in terms of mental health, making

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it incumbent upon researchers to investigate the correlates of depression and self-esteem in rural adolescents. It is currently unclear what factors are correlated with rural adolescent depression and self-esteem. Therefore, the question guiding this exploratory study is: What demographic, social, and school-level factors are associated with symptoms of depression and self-esteem in rural youth?

A Rural Context

Ecological Theory

Bronfrenbrenner's Ecological Theory emphasizes the necessity of viewing human development across multiple environments [12], but still acknowledges the importance of individual characteristics (e.g., gender, SES, race). This theory was used to guide the selection of the variables included in the current analysis. Despite the fact that this theory focuses on the micro-, meso-, macro-, and chronosystems, proximal processes (i.e., social interactions) in the various microsystems [13] are particularly important in the study of adolescent development. An adolescent's microsystems (e.g., school, family, peer group) and the proximal processes that occur in these microsystems directly influence development and mental health functioning.

Positive social interactions across microsystems are associated with healthy social functioning [14], suggesting that supportive relationships may be associated with decreased levels of depressive symptoms and increased levels of self-esteem. This highlights the importance of investigating how positive and supportive microsystem relationships (e.g., parent, teacher, neighborhood, and peer support) might be associated with adolescent mental health functioning. Indeed, previous research on rural youth that utilized an ecological framework found that positive microsystem interactions with peers and parents were associated with decreased anxiety and aggression [15]. Given that supportive relationships are associated with healthy social functioning [14], it is necessary to examine if and how stressful microsystem interactions (i.e., parent–child conflict, negative peer relationships, negative friend behavior) are associated with levels of adolescent depressive symptomology and self-esteem. In addition, individual microsystem experiences are important to consider. For example, both positive microsystem experiences (e.g., school satisfaction, religious orientation, ethnic group involvement) and negative microsystem experiences (e.g., perceived discrimination) could impact mental health.

One benefit of Ecological Systems Theory is that this theory espouses the importance of environmental factors on development. For example, characteristics of the school environment may influence levels of adolescent depressive symptomology and self-esteem. Adolescents spend a significant amount of time at school and are clearly affected by school factors such as school SES, school size, and school racial composition. Finally, the rural macrosystem in the current study provides a unique contextual backdrop to investigate how individual characteristics, supportive and stressful microsystem relationships, proximal processes, and meso- and macrosystem characteristics are associated with adolescent mental health.

Rural Youth

Although rural life is commonly assumed to be less stressful than urban life [11], rural environments expose residents to many stressors absent from urban environments such as geographic isolation that restricts social networks and minimal community resources [16]. The cumulative effect of these additional stressors likely contributes to the high prevalence of poor health outcomes in rural areas (e.g., unintentional injuries, chronic obstructive pulmonary disease, suicide, obesity, and smoking; [17]). Research comparing adults living in urban and rural environments has reported that adults in rural areas experienced higher rates of depression [18]. Few studies have examined depression in rural adolescents.

Rural youth are a vulnerable group and have been found to be more likely than either urban or suburban youth to engage in high-risk behaviors such as smoking cigarettes, drinking alcohol, using drugs, bringing a weapon to school, and having sexual intercourse [19]. In addition, impoverished rural communities have a higher high school dropout rate compared to impoverished suburban areas and cities [20]. The middle school years may play a role in this trend; Witherspoon and Ennett [21] found that reports of school belongingness decreased and reports of school misbehavior increased during middle school in a sample of rural adolescents. Despite such findings, little research has examined health-related risk and protective factors for rural youth [22–25]. There is a particular dearth on the prevalence of and risk factors for psychiatric disorders in this population [26, 27] with available research offering mixed findings.

While one study of Irish adolescents found that females in rural areas were more likely to be depressed and had lower self-esteem than their urban counterparts [28], researchers using a sample of Canadian adolescents found no differences in the rates of depression between rural and urban youth [29]. The strong majority of the studies reviewed below do not comprise rural samples, highlighting the pressing need to uncover what factors are salient for the mental health functioning of rural youth.

Past Research: Correlates of Depression and Self-Esteem

Individual Characteristics

Gender

It is well documented that, compared to males, females are at an increased risk of suffering from depression [2, 7, 30, 31] and low self-esteem [6, 32]. Although boys and girls have similar rates of depression before puberty, after puberty, girls are almost twice as likely to develop depression as boys [31]. Moreover, these findings hold across racial groups as a study of Latino/Latina adolescents found that the connection between depression and low self-esteem was stronger for females than males [33].

Socioeconomic Status

Research examining the influence of household socioeconomic status (SES) on levels of adolescent depression and self-esteem has yielded mixed results. Some researchers have reported a connection between low SES and increased rates of depression [34, 35] and a meta-analysis of 446 samples found that increased SES was significantly related to increased self-esteem among all age groups, including adolescents [36]. However, another meta-analysis of 310 samples of children ages 8–16 found no connection between SES and depression [37] and other researchers found a minimal to moderate connection between SES and self-esteem [38, 39]. The link between poverty and poor child well-being is well established [40] and it seems plausible that low SES could be a risk factor for poor mental health in rural adolescents, however additional research is needed to confirm this link.

Race/Ethnicity

The influence of race/ethnicity on child and adolescent depression may be related to age, as young Caucasian children (ages 8–11 years) had lower depression scores than African American children, and the depression scores of Hispanic children did not differ from either White or African American children. However, these differences disappeared in older age groups (i.e., 12–17, 18–25, and 26–79 years; [41]). Another group of researchers found that Mexican–American adolescents had higher rates of depression than Caucasian, African American, and other Hispanic American adolescents [42]. Indeed, it seems that Hispanics may be at an increased risk for depression [43]. A meta-analysis of 310 samples of children and adolescents (ages 8–16 years, $N = 61{,}424$) found no difference in rates of depression among Caucasians and African Americans, but found that Hispanics had significantly higher rates of depression than the other groups [37]. Findings from a national sample of the general population (ages 15–54 years) indicated that Hispanics had higher rates of affective disorders than Caucasians and African Americans [30]. There is a particular dearth of data in this area for mental health symptoms in American Indian youth.

In terms of self-esteem, a meta-analysis that included studies with samples of adults and children, found that African Americans scored higher than Caucasians on measures of self-esteem and Caucasians' self-esteem scores were higher than the scores of Hispanics, Asians, and American Indians [44]. Recent studies found that African American adolescents had the highest self-esteem scores, followed by, in descending order, Caucasians, Hispanics, and Asians [45].

Microsystem Proximal Processes that Result in Protective Factors

School Satisfaction

The term *school connectedness* describes a student's perception that the adults and peers at school care about the student as an individual and about the student's academic development, which is a protective factor for positive academic and health outcomes [46]. School connectedness is a positive microsystem transaction between the student and his or her school in the mesosystem. School satisfaction results from a good fit between the school and the child. In general, increased school connection is related to lower levels of emotional distress in older and younger adolescents [47]. One way of gauging school connectedness is through measures of school satisfaction. School satisfaction is related to decreased depressive symptoms [8, 48, 49] and increased self-esteem [50]. However, it is unclear if these relationships will hold in rural schools with few resources and shortages of highly skilled teachers.

Ethnic Identity

Ethnic identity refers to the connection to and understanding of one's ethnic group and often connotes attachment and group membership, equating to a positive proximal process or transaction between the adolescent and members of his or her cultural group. The development of ethnic identity signifies a good ecological fit between the individual and his or her macrosystemic cultural milieu. Ethnic identity may be a protective factor that is negatively associated with depression [51]. However, a study of predominantly American Indian youth found that there was no association between levels of ethnic identity and depression [52]. There is a well-documented, positive association

between ethnic identity and self-esteem [53–57]. This relationship may be moderated by race as White and Burke [58] found that Caucasians with increased ethnic identity had lower self-esteem while African Americans showed the opposite trend. Further investigation of the connection between ethnic identity and mental health in racially/ethnically diverse rural youth is needed due to scant existing literature.

Religion

It stands to reason that a strong belief in the importance of religion would equate with increased participation in religious activities, which is often a protective factor for youth and a positive proximal processes across the individual's micro-, meso-, and macrosystem. Specifically, religious orientation results from transactions between the individual, his or her family, peers, church members, and religious institutions in the macrosystem.

Although some research has shown that participation in religious practices is a protective factor for depression and self-esteem, overall findings have been mixed. One study found that participation in religious activities was associated with decreased depression and increased self-esteem among Caucasian and African American youth [59]. However, another study suggested the protective nature of religious participation was related to gender, and found that increased religiosity decreased the risk for depression only in females [60]. A systematic review reported that 18–20 reviewed articles found that religious participation led to improved mental health in adolescents, but the relationship was stronger for males than females [61].

Similarly, research examining the relationship between religion and self-esteem has produced mixed results. Whereas some researchers have found that increased participation in religious activities was associated with increased self-esteem [62, 63], other studies failed to find an association between religion and self-esteem [64, 65]. It remains to be seen if rural adolescents in close-knit rural congregations manifest religious orientation as a key protective factor influencing depression and self esteem.

Microsystem Proximal Processes That Lead to Positive Social Support

Supportive Adult Relationships

The experience of positive relationships with adults (e.g., parents, teachers, neighbors) is a protective factor for adolescents. Across several studies, secure parental attachment was related to decreased adolescent depression [49, 66, 67] and increased adolescent self-esteem [66, 68]. In addition, high levels of parent- and teacher-support and positive relationships with these adult figures increased adolescents' self-esteem [69, 70]. These positive relationships are the result of the adolescents' adaptive ability to have positive proximal transactions across ecological systems (e.g., family, school, neighborhood). Community support can also play a role in adolescent's psychological well-being. For example, researchers found that higher levels of perceived neighborhood support were associated with decreased levels of depression [49, 71] and increased levels of self-esteem [49]. Witherspoon et al. [49] suggest that the positive effects of social support are cumulative; the more numerous the youths' social connections (i.e., family, school, and neighborhood), the lower their reported rates of depression and the higher their reported rates of self-esteem.

Supportive Peer Relationships

These findings extend to peer relationships as well. Adolescents with secure peer attachments reported lower levels of depression [8] and increased self-esteem [68] as compared to adolescents with insecure peer attachments. In addition, adolescents with high levels of peer support experienced lower levels of depression [72] and higher levels of self-esteem [69, 72]. Supportive microsystem relationships exert significant influence on levels of adolescent depression symptomology and self-esteem for urban and suburban adolescents. The current study examines if this is also true for their rural counterparts.

Stressful Microsystem Interactions in Negative Proximal Processes

Parent–Child conflict

Negative parent–child relationships are a potentially damaging microsystem social interaction that may be associated with increased depressive symptomology and decreased self-esteem. Factors in the home environment associated with increased adolescent depression and low self-esteem include poor parent–child relationships, extreme parental control, and high levels of parent–child conflict [7, 73–75]. In fact, family conflict is so detrimental that Holtzman and Roberts [76] found that family conflict partially mediated the relationship between high levels of community violence and depression. This body of research suggests that parent–child conflict may be associated with increased levels of depressive symptomology and decreased levels of self-esteem.

Negative Peer Relationships

As adolescents explore their independence from family, they spend more time with peers and, thus, peer relationships have substantial influence on adolescent depression

and self-esteem. Unsupportive peer relationships serve as stressful microsystem social interactions that may damage adolescent mental health functioning. Although one study reported that peer victimization and negative friendships were related to increased depression among adolescents [77], in general, it is difficult to ascertain if depression is the cause or the effect of the negative peer relationships. Moreover, another study found that adolescents who reported depressive symptoms had poorer quality peer relationships and more insecure peer attachments relative to adolescents with no reported symptoms of depression [78]. Poor peer relationships are also a risk factor for low self-esteem [72, 79]. Negative proximal processes between the adolescent and his or her parents and peers may signify a poor ecological fit that results in feelings of rejection, disconnection, depression, and low self regard.

Meso- and Macrosystem Risk Factors

Perceived Discrimination

Perceived discrimination is a negative proximal process linking the individual to deleterious messages from his or her macrosystem. The resulting poor ecological fit may be associated with decreased adolescent mental health functioning. In a five-year longitudinal study, Brody and colleagues [80] found that perceived discrimination was significantly associated with depressive symptoms among African American adolescents. Another study investigating the relationship between perceived discrimination and substance use in African American parents and adolescents found that this relationship was mediated by distress (i.e., depression) for both parents and adolescents [81]. Some research suggests that self-esteem plays a role in the relationship between perceived discrimination and depression. For example, Umaña-Taylor and Updegraff [57] found that self-esteem partially mediated the relationship between perceived discrimination and depressive symptoms in a sample of Latino adolescents. In fact, several studies have identified a link between perceived discrimination and self-esteem among African American adolescents [82, 83], Latino adolescents [73, 84], as well as in a sample of African American, Latino, and Asian youth [85]. From an ecological perspective, macrosystemic discrimination trickles down into microsystem transactions, making it increasingly difficult for adolescents to create positive proximal processes and feel a nurturing fit within their eco developmental niche.

School Characteristics

In addition to capturing youths' perceptions and experiences, measuring school structural characteristics is also necessary when using an ecological framework to understand adolescent development [86]. Because schools are a socializing force for children and adolescents [87], it is important to understand which school characteristics affect adolescents' psychological functioning. For example, one group of researchers found that school racial configuration was related to high levels of depression and somatic symptoms among African American students attending predominantly Caucasian schools [87]. The importance of school racial composition also holds true for self-esteem as evidenced by Ross's [88] study that showed African American students attending schools with an African American student majority reported higher self-esteem than African American students attending schools with a majority Caucasian student body or a racially/ethnically balanced student body. Similar to the effect of low household SES on youths' levels of depression and self-esteem, researchers have found that children attending low SES schools are at an increased risk for depression, low self-esteem, and poor mental health outcomes [22].

School size is an important school-level characteristic: Students have reported feeling less safe in larger schools [89], probably because larger schools have more frequent problems with violent acts [90], crime [91], discipline problems, and vandalism [92]. Large school size was related to decreased school attachment among students, which in turn, led to decreased attachment to teachers (key positive adult relationships) and decreased participation in extracurricular activities [93], all of which may contribute to depression and low self-esteem. Like discrimination, these negative school characteristics prevent adolescents from developing positive proximal processes within their microsystem transactions and lead to feelings of poor fit between the individual and his or her environment.

Hypotheses

Given the exploratory nature of the current study, the goal was to further uncover what individual characteristics, supportive microsystem relationships, stressful microsystem interactions, meso- and macrosystem characteristics were associated with symptoms of depression and levels of self-esteem in rural youth. There is a lack of literature on rural youth in general. Further illuminating factors associated with rural adolescent's mental health functioning will provide additional information that rural mental health practitioners can use to increase the effectiveness of their services.

Based on the extant literature, the hypotheses guiding the current study were: (1) Being female and having a low SES would be associated with an increased probability of reporting increased symptoms of depression and decreased levels of self-esteem, (2) Being Hispanic would be

associated with an increased probability of reporting increased depressive symptoms and decreased rates of self-esteem compared to the other races, while being African American would be associated with an increased probability of reporting low levels of depressive symptoms and high levels of self-esteem compared to the other races, (3) Supportive microsystem relationships (i.e., positive adult and peer relationships) and positive microsystem proximal processes (i.e., school satisfaction, ethnic identity, religious orientation) would be associated with a higher probability of reporting low levels of depressive symptoms and high levels of self-esteem, (4) Stressful microsystem social interactions (i.e., parent–child conflict, negative peer relationships, negative friend behavior) and macrosystem stress (i.e., perceived discrimination) would be associated with a higher probability of reporting high levels of depressive symptoms and low levels of self-esteem, and (5) A larger school size and lower school SES would be mesosystem risk factors associated with an increased probability of reporting high levels of depressive symptoms and low levels of self-esteem.

Methods

Current Study

The current research was funded by the United States Centers for Disease Control and Prevention through a cooperative agreement with the North Carolina Academic Center for Excellence in Youth Violence Prevention (NC–ACE). The current sample came from the Rural Adaptation Project (RAP), a 5-year longitudinal panel study of more than 4,000 middle school students in two rural, economically disadvantaged counties within the Southeastern United States. The aim of the larger NC–ACE study is to reduce rates of youth violence by implementing a multi-level youth violence prevention initiative: two school-based programs (Positive Behavior Intervention and Support and Positive Action), a parenting program (Parenting Wisely), and a juvenile court program (Teen Court). The data for the current study were collected at baseline in Spring 2011 before the intervention programs were implemented.

The current sample included participants from two counties. The sample from the County 1 included all middle school students (i.e., a complete census of 6, 7, and 8th graders) in public schools. County 2 was much larger than the County 1 both in geography and in student population size, thus in County 2, a random sample of 40 % of public middle school students in 6–8th grades was included in the assessment. Students assented to participate by reading and electronically signing an assent screen prior to completing the online assessment. Participating students from 28 different schools filled out the assessment package in school computer labs with close supervision by research staff. Each student had an identification number that was attached to his or her assessment to maintain confidentiality.

An Impoverished Rural Context

The previously mentioned rural stressors must be considered in the context of the current study. Both counties have extremely limited public transportation services that operate on a restricted schedule. Given the wide dispersion of people (i.e., average population density per square mile for the two counties is 101.65; [94]) and resources, this lack of public transportation is problematic. Additionally, the nearest large city is about 100 miles from both counties, making it difficult to access the resources present in a large city that may be absent in rural environments (e.g., a large hospital). Infant mortality is often used as a way of gauging the overall health of an area and the average infant mortality rate of the two counties is 22 per 1,000 people, which is over 3 times the national average [95]. The economic disadvantage of the two counties is evidenced by the unemployment rate, which is approximately 12 %, five percentage points higher than the national average [96].

Participants

The mean age of participants ($N = 4{,}321$) was 12.8 years and the sample was 47 % male ($n = 2{,}031$). The sample was racially diverse and 28 % of participants ($n = 1{,}210$) identified as American Indian/Native American, 22.5 % ($n = 972$) as Caucasian, 22 % ($n = 951$) as African American, 12 % ($n = 519$) as Hispanic/Latino, and 11 % ($n = 475$) as Mixed race or Other. Approximately 33 % of the sample came from each of the three middle school grades, and 66 % of the participants received a free or reduced price lunch.

Measures

The School Success Profile (SSP; [97]) is a 220-item youth self-report survey that measures attitudes and perceptions about health and well-being, school, friends, family, neighborhood, and self. Since its creation in 1993, the SSP has been administered to tens of thousands of students and its reliability and validity are well documented [98] making it an ideal tool to assess ecological risk and protective factors for rural youth. The current study used a modified version of the SSP, the School Success Profile Plus (SSP+), which included 152 of the original SSP items (i.e., 21 of the subscales from the original SSP) and four additional sub-scales: a modified version of the Rosenberg self-

Table 1 Descriptive statistics

Variable	Mean	SD
Demographics		
Age	12.84	1.10
Gender (male)		
Female	0.53	0.50
Free/reduced price lunch (no)		
Yes	0.67	0.47
Race (white)		
African American	0.22	0.42
Hispanic	0.12	0.33
Native American	0.28	0.45
Mixed/other	0.11	0.31
Individual microsystem experiences		
Ethnic identity	3.40	1.00
Religious orientation	2.34	0.66
Perceived discrimination	1.45	0.55
School satisfaction	2.37	0.48
Microsystem social support		
Teacher support	3.17	0.56
Parent support	2.68	0.49
Friend support	2.49	0.55
Neighbor support	3.03	0.60
Stressful microsystem social interactions		
Parent–child conflict	2.07	2.50
Negative friend behavior	1.40	0.44
Negative peer relationships	1.30	0.35
School-level characteristics		
School size	511	236
Grade level reading (%)	57.80	9.22
Grade level math (%)	75.27	6.95
Teacher turnover (%)	11.30	8.70
Teachers w/advanced degrees (%)	23.15	8.44
White Students (%)	27.00	23.58
African American student (%)s	30.39	20.25
Hispanic students (%)	9.41	10.28
Native American students (%)	32.01	30.22
Students receiving free/reduced lunch (%)	65.62	11.19
4–10 years of teacher experience (%)	28.75	9.27
10+ years experience (%)	51.15	14.15

esteem scale [99]; the Multigroup Ethnic Identity Measure (MEIM; [100]); the Perceived Discrimination Scale (103–105), and the Conflict Behavior Questionnaire (CBQ; [101]), which was used to measure parent–child conflict. The current analysis used 13 subscales from the SSP+ (i.e., nine subscales that were from the original SSP and the four additional subscales). The subscales included in this study were hypothesized to be correlated with depression and self-esteem based on existing literature; the excluded subscales were not considered to be salient to levels of depression and self-esteem and were therefore not used for the current analysis. See Table 1 for descriptive statistics of the sample and scales.

Independent Variables

Five groups of independent variables (demographic variables, supportive microsystem social relationships, stressful microsystem interactions, individual characteristics, and school-level characteristics) were used in the analysis. These variables were chosen based on theory and prior studies about significant predictors and covariates of psychological well-being.

Individual Characteristics

The student's age was measured in years. Additional demographic variables included gender (*male* was the reference group coded as 0), family SES measured by whether free or reduced lunch was received (*no* was the reference group coded as 0), and race/ethnicity (four dichotomous variables: Hispanic, African American, American Indian, and Mixed race or Other; *Caucasian* was the reference group coded as 0).

Microsystem Proximal Processes that Result in Protective Factors

Experiences across the microsystem were measured using four self-report scales: school satisfaction, ethnic identity, religious orientation, and discrimination experiences.

The seven-item School Satisfaction scale [97] measured students overall satisfaction with school experiences. Example items included: "I enjoy going to this school" and "I get along well with teachers at this school." Each item was rated on a 3-point Likert Scale (*Not Like Me, A Little Like Me, or A Lot Like Me*) and the Cronbach's alpha reliability was 0.84 in this sample.

Ethnic identity was measured using the six-item revised Multigroup Ethnic Identity Measure [100]. This extensively used scale measures students' connection to and understanding of their ethnic group and has established validity and reliability [102]. Example items included: "I have a strong sense of belonging to my own ethnic group" and "I have spent time trying to find out more about my ethnic group, such as its history, traditions, and customs." Each item was rated on a 5-point Likert Scale (*Strongly Disagree, Disagree, Neither Agree nor Disagree, Agree, or Strongly Agree*). The Cronbach's alpha reliability for this sample was 0.92.

The three-item Religious Orientation scale [97] measured the importance of religion in students' lives. Items

included: "Religion plays an important role in my daily life," "My religious faith gives me strength," and "My religious faith influences the decisions I make." Each item was rated on a 3-point Likert Scale (*Not Like Me, A Little Like Me, or A Lot Like Me*) and the Cronbach's alpha reliability was 0.89 in this sample.

The three-item Perceived Discrimination scale [103–105] assessed how frequently a child experienced unfair treatment due to race or ethnicity. The scale items included: "How often do people dislike you because of your race or ethnicity?" "How often are you treated unfairly because of your race or ethnicity?" and "How often have you seen friends treated unfairly because of their race or ethnicity?" The possible responses for each item were *Never, Sometimes, Frequently, or Always*. Cronbach's alpha reliability for this scale was 0.71 in the current sample.

Microsystem Social Supports

Supportive microsystem relationships affecting depression and self-esteem were measured using four self-rated scales: parent support, neighborhood support, teacher support, and friend support.

The five-item Parent Support scale [97] measured the frequency over the past 30 days that an adult in the child's home provided emotional support. Items included: "How often did the adults in your home let you know that you were loved?" and "How often did the adults in your home tell you that you did a good job?" The possible responses for each item were *Never, Once or Twice, or More than Twice* and the Cronbach's alpha reliability was 0.89 in the current sample.

The five-item Neighborhood Support scale [97] measured students' perceptions of the degree to which adults in the neighborhood are interested in and offer help to young people. Example items included: "Adults in my neighborhood are interested in what young people in the neighborhood are doing" and "People in my neighborhood really help one another out." Each item was rated on a 4-pointl Likert scale (*Strongly disagree, Disagree, Agree, or Strongly Agree*) and the Cronbach's alpha reliability was 0.78 in the current sample.

The eight-item Teacher Support scale [97] measured students' perceptions of their teachers' supportive behavior. Example items included: "My teachers care about me" and "My teachers give me a lot of encouragement." Each item was rated on a 4-point Likert Scale (*Strongly Disagree, Disagree, Agree, or Strongly Agree*) and the Cronbach's alpha reliability was 0.88 in the current sample.

The five-item Friend Support scale [97] measured students' perceptions of how supportive their friends are. Example items included: "I can count on my friends for support" and "I can trust my friends." Each item was rated on a 3-point Likert Scale (*Not Like Me, A Little Like Me, or A Lot Like Me*) and the Cronbach's alpha reliability was 0.89 in the current sample.

Stressful Microsystem Interactions

Negative social interactions in the microsystem were measured using three scales: parent–child conflict, negative friend behavior, and negative peer relationships.

Parent–child conflict was measured using 10 of the 20 items from the Conflict Behavior Questionnaire (CBQ; [101]). A modified version of the CBQ was used in order to limit the length of the SSP+. This scale assessed the degree of conflict in the parent–child relationship and the reliability and validity have been documented [106]. Example items included: "At least three times a week, my parent(s) and I get angry at each other" and "My parent(s) put me down." The possible responses for each item were *True* or *False* and the Cronbach's alpha reliability was 0.82 in the current sample.

The nine-item Negative Friend Behavior scale [97] measured the prevalence of anti-social peer behaviors. Example items included: "I have friends who use drugs" and "I have friends who belong to gangs." Each item was rated on a 3-point Likert scale (*Not Like Me, A Little Like Me, A Lot Like Me*) and had a Cronbach's alpha reliability of 0.89 in this sample.

The eight-item Negative Peer Relationships scale [97] measured students' perceptions of the quality of their peer relationships. Example items included: "I am made fun of by my friends" and "I do things to be popular with my friends." Each item was rated on a 3-point Likert Scale (*Not Like Me, A Little Like Me, or A Lot Like Me*) and the Cronbach's alpha reliability was 0.74 in the current sample.

School-Level Characteristics

The current analysis used 12 aggregated school characteristics drawn from administrative data: school size, percentage of students at or above grade level in reading, percentage of students at or above grade level in math, teacher turnover rate measured by percentage of teachers leaving in a year, percent of teachers with advanced degrees, percentage of White students, percentage of African American students, percent of Hispanic students, percent of Native American students, percent of students using free or reduced lunch (a proxy for SES), percent of teachers with 4–10 years of teaching experience, and percent of teachers with 10 years or more of teaching experience. This information is publically accessible administrative data.

Dependent Variables

Depressive symptoms and self-esteem were the two dependent variables used to assess students' psychological functioning. The depression scale was comprised of four items taken from the SSP [97] that measured depressive symptoms. Items included: "I often feel sad," "I often feel all alone in the world," "I often wonder whether anyone really cares about me," and "I often feel lost or confused." The Cronbach's alpha reliability for this scale was 0.87 in this sample. The 5-item self-esteem scale was an adapted version of the Rosenberg Self-Esteem Scale [99] and included the following items: "I feel good about myself," "I am able to do things as well as most other people," "I am satisfied with myself," "I have a number of good qualities," and "I have confidence in myself." Five of the original items from Rosenberg [99] were deleted for brevity on a long assessment and items were worded to decrease confusion for a low literacy middle school population. Cronbach's Alpha reliability for this scale was 0.88 in the current sample. Items from the depression and self-esteem scales used the same 3-point Likert-like response scale (*Not Like Me, A Little Like Me*, and *A Lot Like Me*).

Data Analysis

One methodological issue that needs to be addressed in multilevel analysis is the control of clustering effects. By design, students coming from the same school may share common characteristics on an outcome variable in comparison to students from other schools. The presence of clustering violates the independent-observation assumption embedded in a regression model and leads to an incorrect test for statistical significance of predictor variables. Using the intraclass correlation coefficient (ICC) developed by Raudenbush and Bryk [107] we tested the clustering effects of the two outcomes in their original metric (i.e., as a continuous variable). The *ICC* is defined by the following equation:

$$ICC = \frac{\sigma_u^2}{\sigma_u^2 + \sigma_e^2}$$

where σ_u^2 is the between-group variance, and σ_e^2 is the within-group variance. Results showed that clustering effects in each outcome variable were very low. The ICC values were 0.0083 for the depression scale and 0.0025 for the self-esteem scale. The results suggested that less than 1 % of variation in the outcome variables lies between schools. Therefore clustering effects were not present and data analysis could assume independent observations.

Descriptive analysis showed that the outcomes of depressive symptoms and self-esteem were non-normally distributed with a positively skewed distribution (results are available by request). Given that linear models (e.g., regression, hierarchical linear modeling) assume normal distribution of the dependent variable, it was not possible to analyze these variables in their original metric. Therefore, the current study employed an ordered logistic regression [108]. After rounding (i.e., recoding the values of 1–1.4 of y into value 1, the values of 1.5–2.4 of y into value 2, and the values of 2.5–3 of y into value 3), the dependent variable y had three ordinal levels, ranging from 1 to 3. Ordered logistic regression assumes that each ordinal category is determined by the change of a latent continuous variable: with k ordinal levels, the model assumes *k-1* threshold or cutoff values of the continuous latent variable at which the observed category makes changes. For the current study, k is 3 and the number of threshold values is 2. The ordered logistic regression models the probability of having each of the three ordinal categories as a function of the independent variables and the two threshold values. Denoting the dependent variable of interest (i.e., depression or self-esteem) as y, the independent variables as vector x, and the regression parameters as vector β, the probability of having an ordinal category may be expressed as:

$$\Pr(y = 1|x) = \frac{\exp(\tau_1 - x\beta)}{1 + \exp(\tau_1 - x\beta)},$$

$$\Pr(y = 2|x) = \frac{\exp(\tau_2 - x\beta)}{1 + \exp(\tau_2 - x\beta)} - \frac{\exp(\tau_1 - x\beta)}{1 + \exp(\tau_1 - x\beta)}, \text{ and}$$

$$\Pr(y = 3|x) = 1 - \frac{\exp(\tau_2 - x\beta)}{1 + \exp(\tau_2 - x\beta)}$$

respectively, where τ_1 and τ_2 are the threshold values. In the above equation, each element in the estimated vector β is a regression coefficient, and an exponent of the coefficient is an odds ratio. We employed the Stata *ologit* program (i.e., an estimator of maximum likelihood) to estimate the ordered logistic regression.

In order to assess the relative impact of demographic variables, positive microsystem social interactions and experiences, negative microsystem social interactions and experiences, and school characteristics, each block of variables was entered into an ordered logistic regression hierarchically. This allowed for a comparison of pseudo R^2 statistics. The final analytic model for each outcome variable was an ordered logistic regression that contained all independent variables. In our presentation, we used model-predicted probabilities, rather than regression coefficients or odds ratios, because probabilities have straightforward meaning and are analogous to proportions.

Handling Missing Data

To handle missing data, we followed Allison [109] and employed a listwise deletion of the missing data. Consequently, the sample analyzed in this study is comprised of 3,403 students in the depression model and 3,405 students in the self-esteem model. That is, the analysis sample used 78.8 % of students of the original sample. A series of bivariate analyses were performed to discern differences on key demographic variables between the sample analyzed and the sample not analyzed. Results showed that the sample analyzed was slightly older (i.e., 0.16 years older on average, $p < .001$), had a higher proportion of females (i.e., 9.33 percentage points higher, $p < .001$), a lower proportion of students using free and reduced lunch (i.e., 6.38 percentage points lower, $p < .001$), a lower proportion of African American students (i.e., 9.29 percentage points lower, $p < .001$), a higher proportion of American Indian students (i.e., 8.94 percentage points higher, $p < .001$), and a slightly lower proportion of students from mixed or other races (i.e., 2.76 percentage points lower, $p < .05$) than the sample not analyzed. Based on these results it is clear that the data was not "Missing At Random" (MAR) and according to Allison [109], listwise deletion is a robust method when MAR is violated.

Results

Overall, 9.14 % of the analyzed sample reported high levels of depressive symptoms and 59.24 % reported low levels of depressive symptoms. The final depression model with all independent variables entered fit the data as evidenced by a Chi square of 1,313.99 (with 30 degrees of freedom) that was statistically significant at a 0.0001 level. When the blocks of variables were added to the model hierarchically, stressful microsystem social interactions, followed by microsystem proximal processes that result in protective factors (e.g., school satisfaction, ethnic identity, religious orientation), led to the largest increase in the pseudo R-square statistic. The final depression model's pseudo R-square indicated that 21.58 % of the variation in depression was explained by the covariates included in the model. The relative contributions of the ecological blocks were as follows for the depression model: Individual characteristics—2.35 % (due to gender and SES); microsystem proximal processes—5.9 % (due to discrimination and school satisfaction); microsystem social support—3.77 % (due to parent support); stressful microsystem social interactions—9.28 % (due to parent–child conflict, negative friend behavior, and negative peer relationships); and school characteristics—0.28 % (due to teacher turnover and school SES).

The final self-esteem model with all independent variables entered had a Chi square of 895.23 (with 30 degrees of freedom) that was statistically significant at a 0.0001 level. The blocks of variables were added to the model hierarchically and micorsystem proximal processes, followed by microsystem social support led to the largest increases in the pseudo R-square statistic. The relative contributions of the ecological blocks were as follows for the self esteem model: Individual characteristics—2.45 % (due to gender and race); microsystem proximal processes—12.19 % (due to ethnic identity, religious orientation, and school satisfaction); microsystem social support—4.45 % (due to parent support and friend support); stressful micorsystem social interactions—1.75 % (due to parent–child conflict and negative peer relationships); school characteristics—0.54 % (no school characteristic was statistically significant).

This final self-esteem model's pseudo R-square indicated that about 21.38 % of the variation in self-esteem was explained by the covariates included in the model. Overall, 2.35 % of the analyzed sample reported low levels of self-esteem and 77.35 % reported high levels of self-esteem. The correlation between the depression and self-esteem scales was -0.352. Significant correlates of depressive symptoms and self-esteem are summarized below.

Individual Characteristics

Results indicated that females (5.96 %) had a higher probability of reporting high levels of depressive symptoms as compared to males (2.89 %, $p < .001$) and females (1.10 %) had a higher probability of reporting low levels of self-esteem as compared to males (0.74 %, $p < .001$). Students using free or reduced price lunch (4.84 %) had a higher probability of reporting high levels of depressive symptoms as compared to students not receiving free or reduced price lunch (3.30 %, $p < .001$). African American (88.40 %) and Native American (86.00 %) students had an increased probability of reporting high levels of self-esteem as compared to Caucasian students (77.48 %, $p < .001$).

Microsystem Proximal Processes That Lead to Protective Factors

The probability of reporting a high level of self-esteem was significantly greater for students who reported high levels of ethnic identity (82.56 %) and religious orientation (87.03 %) as compared to students who reported low levels of ethnic identity (78.38 %, $p < .01$) and religious orientation (73.29 %, $p < .001$). The probabilities of reporting low levels of depressive symptoms and high levels of self-

esteem were significantly greater for students who reported high levels of school satisfaction (66.61 and 90.59 % respectively) as compared to students reporting low levels of school satisfaction (45.21 and 54.51 %, respectively; $p < .001$).

Microsystem Social Support

The probabilities of reporting low levels of depressive symptoms and high levels of self-esteem were significantly greater for students who reported high levels of parent support (63.50 and 86.32 %, respectively) compared to students who reported low levels of parent support (41.84 and 59.61 % respectively; $p < .001$). The probability of reporting high levels of self-esteem was significantly greater for students who reported high levels of friend support (86.59 %) as compared to students who reported low levels of friend support (70.30 %, $p < .001$).

Stressful Microsystem Social Interactions

The probabilities of reporting high levels of depressive symptoms and low levels of self-esteem were significantly greater for students who reported high levels of parent–child conflict (30.99 and 1.85 %, respectively) as compared to students who reported low levels of parent–child conflict (2.36 and 0.76 % respectively; $p < .001$). The probability of reporting high levels of depressive symptoms was significantly greater for students who reported high levels of negative friend behaviors (7.91 %) as compared to students who reported low levels of negative friend behaviors (3.65 %, $p < .001$). The probabilities of reporting high levels of depressive symptoms and low levels of self-esteem were significantly higher for students who reported high levels of negative peer relationships (31.60 and 3.92 %, respectively) as compared to students who reported low levels of negative peer relationships (2.88 and 0.71 %, respectively; $p < .001$).

Meso- and Macrosystem Risk Factors

The probability of reporting low levels of depressive symptoms was significantly greater for students in schools that had a higher teacher turnover rate (76.51 % for a teacher turnover rate of 50 %) as compared to schools with a lower teacher turnover rate (54.68 % for a teacher turnover rate of 0 %; $p < .05$). The probability of reporting low levels of depressive symptoms was significantly greater for students in schools with a higher percentage of students receiving free/reduced price lunch (63.21 % for schools where 80 % of students receive free or reduced price lunch) as compared to schools with a lower percentage of students receiving free/reduced price lunch (47.82 % for schools where 10 % of students receive free or reduced price lunch; $p < .05$). The probability of reporting high levels of depressive symptoms was significantly greater for students who reported high levels of perceived discrimination (7.44 %) as compared to students who reported low levels of perceived discrimination (3.62 %, $p < .001$). See Table 2 for all model-predicted probabilities.

Discussion

The findings of this study expand the limited literature examining the psychological functioning of rural youth, illuminating the correlates of depressive symptomology and self-esteem in this disadvantaged sample. As is indicated by differences in pseudo R-square statistics, microsystem proximal processes that lead to protective factors (ethnic identity, religious orientation, and school satisfaction) were important predictors of both depressive symptoms and self-esteem, while stressful microsystem social interactions were more salient for depressive symptoms and social supports were significant for self-esteem. Indeed, this pattern of effects underscores the application of Ecological Theory for rural youth. Proximal microsystem processes lay at the core of adolescent identity development. Considering the dynamic feedback loops between adolescents and the microsystem influences that surround them, group affiliation manifested by ethnic identity, religious orientation, and school satisfaction provides a "social address" for personal identity that is ultimately closely aligned with mental health functioning. Social supports embedded in micro- and mesosystem interactions further buttress self-esteem while negative social interactions threaten well-being with the possibility of increased depressive symptoms. Social influences, although salient, are less powerful than psychological processes.

Consistent with past research [6, 7, 30, 32] and hypothesis 1, being female was associated with high levels of depressive symptoms and low levels of self-esteem. One possible explanation for this finding stems from the fact that girls go through puberty earlier than boys. The importance of this biological difference is explained by the maturational deviance hypothesis, which states that early puberty is a deviation from the norm and the resulting stress may lead to internalizing disorders such as depression [31]. Another possible explanation for this gender difference could be the strictly prescribed gender roles often found in rural communities, many of which subscribe to traditional roles in which men are supposed to be masculine and dominant and women are expected to be feminine and compliant [110]. Perhaps the adolescent girls in this sample internalized this expectation of subservience,

Table 2 Model predicted probabilities for depression and self-esteem

Characteristic	Depression model				Self-esteem model			
	Sig	Low	Medium	High	Sig	Low	Medium	High
All		0.60	0.36	0.04		0.01	0.16	0.83
Age								
11		0.63	0.34	0.04		0.01	0.14	0.85
12		0.61	0.35	0.04		0.01	0.15	0.84
13		0.60	0.36	0.04		0.01	0.16	0.83
14		0.59	0.37	0.05		0.01	0.17	0.82
15		0.57	0.38	0.05		0.01	0.18	0.81
16		0.56	0.39	0.05		0.01	0.19	0.79
Gender	***				***			
Female		0.51	0.43	0.06		0.01	0.18	0.81
Male		0.69	0.28	0.03		0.01	0.13	0.86
Free/reduced price Lunch	***							
Yes		0.57	0.38	0.05		0.01	0.16	0.83
No		0.66	0.30	0.03		0.01	0.16	0.83
Race								
African American		0.61	0.35	0.04	***	0.01	0.11	0.88
Hispanic		0.60	0.36	0.04		0.01	0.21	0.77
Mixed/other		0.63	0.33	0.04		0.01	0.17	0.82
Native American		0.60	0.36	0.04	***	0.01	0.13	0.86
White		0.60	0.37	0.05		0.01	0.21	0.77
Ethnic identity					**			
Low		0.64	0.32	0.04		0.01	0.20	0.78
Medium		0.61	0.35	0.04		0.01	0.18	0.81
High		0.57	0.38	0.05		0.01	0.16	0.83
Religious orientation					***			
Low		0.59	0.36	0.04		0.01	0.25	0.73
Medium		0.60	0.36	0.04		0.01	0.18	0.81
High		0.61	0.35	0.04		0.01	0.12	0.87
School satisfaction	***				***			
Low		0.45	0.47	0.08		0.04	0.42	0.55
Medium		0.56	0.39	0.05		0.01	0.21	0.77
High		0.67	0.30	0.03		0.00	0.09	0.91
Teacher support								
Low		0.66	0.31	0.03		0.01	0.17	0.82
Medium		0.62	0.34	0.04		0.01	0.16	0.83
High		0.58	0.37	0.05		0.01	0.15	0.84
Parent support	***				***			
Low		0.42	0.50	0.09		0.03	0.37	0.60
Medium		0.53	0.42	0.06		0.01	0.23	0.75
High		0.64	0.33	0.04		0.01	0.13	0.86
Friend support					***			
Low		0.58	0.37	0.05		0.02	0.28	0.70
Medium		0.59	0.36	0.04		0.01	0.19	0.80
High		0.61	0.35	0.04		0.01	0.13	0.87
Neighbor support								
Low		0.58	0.37	0.05		0.01	0.19	0.80
Medium		0.60	0.36	0.04		0.01	0.17	0.82

Table 2 continued

Characteristic	Depression model				Self-esteem model			
	Sig	Low	Medium	High	Sig	Low	Medium	High
High		0.61	0.35	0.04		0.01	0.14	0.85
Parent–child conflict	***				***			
Low		0.74	0.24	0.02		0.01	0.13	0.86
High		0.13	0.56	0.31		0.02	0.27	0.71
Negative friend behavior	***							
Low		0.64	0.32	0.04		0.01	0.17	0.82
Medium		0.54	0.41	0.05		0.01	0.14	0.85
High		0.44	0.48	0.08		0.01	0.12	0.87
Negative peer relationships	***				***			
Low		0.70	0.28	0.03		0.01	0.13	0.87
Medium		0.37	0.53	0.10		0.02	0.26	0.73
High		0.13	0.56	0.32		0.04	0.43	0.53
Perceived discrimination	***							
Low		0.64	0.32	0.04		0.01	0.15	0.84
Medium		0.55	0.40	0.05		0.01	0.17	0.82
High		0.46	0.47	0.07		0.01	0.19	0.80
School size								
150		0.58	0.37	0.05		0.01	0.17	0.82
550		0.60	0.35	0.04		0.01	0.16	0.83
950		0.63	0.34	0.04				
Grade level reading (%)								
40		0.58	0.37	0.05		0.01	0.15	0.84
60		0.60	0.35	0.04		0.01	0.16	0.83
80		0.63	0.33	0.04		0.01	0.16	0.83
Grade level math (%)								
60		0.58	0.37	0.05		0.01	0.19	0.79
75		0.60	0.36	0.04		0.01	0.16	0.83
90		0.62	0.34	0.04		0.01	0.13	0.87
Teacher turnover (%)	*							
0		0.55	0.40	0.05		0.01	0.18	0.80
25		0.66	0.30	0.03		0.01	0.13	0.86
50		0.77	0.21	0.02		0.00	0.09	0.91
Teachers w/advanced degrees (%)								
10		0.60	0.35	0.04		0.01	0.15	0.84
25		0.60	0.36	0.04		0.01	0.16	0.83
40		0.60	0.36	0.04		0.01	0.17	0.82
White students (%)								
1		0.61	0.35	0.04		0.01	0.15	0.84
40		0.60	0.36	0.04		0.01	0.16	0.83
80		0.60	0.37	0.04		0.01	0.18	0.81
African American students (%)								
1		0.63	0.33	0.04		0.01	0.18	0.81
40		0.59	0.36	0.04		0.01	0.15	0.84
80		0.56	0.39	0.05		0.01	0.13	0.87
Hispanic students (%)								
1		0.62	0.34	0.04		0.01	0.16	0.83
25		0.56	0.39	0.05		0.01	0.16	0.84

Table 2 continued

Characteristic	Depression model				Self-esteem model			
	Sig	Low	Medium	High	Sig	Low	Medium	High
50		0.49	0.44	0.06		0.01	0.15	0.84
Native American students (%)								
0		0.60	0.36	0.04		0.01	0.17	0.82
50		0.60	0.36	0.04		0.01	0.15	0.84
100		0.60	0.35	0.04		0.01	0.13	0.86
Students receiving free/reduced lunch (%)*								
10		0.48	0.45	0.07		0.02	0.24	0.74
45		0.56	0.39	0.05		0.01	0.19	0.80
80		0.63	0.33	0.04		0.01	0.14	0.85
4–10 years of teacher experience (%)								
10		0.60	0.36	0.04		0.01	0.19	0.80
30		0.60	0.36	0.04		0.01	0.16	0.84
50		0.60	0.35	0.04		0.01	0.13	0.86
10+ years experience (%)								
30		0.60	0.35	0.04		0.01	0.18	0.81
55		0.60	0.36	0.04		0.01	0.15	0.84
80		0.60	0.36	0.04		0.01	0.18	0.86

* $p < .05$

** $p < .01$

*** $p < .001$

leading to feelings of powerlessness that result in depressive symptoms and low self-esteem. Further, in impoverished rural settings, females may become acutely aware of the few future opportunities open to them and respond with higher levels of internalized despondence.

Also consistent with findings reported in previous research [34, 35, 43] and the second part of hypothesis 1, our results showed that the probability of reporting high levels of depressive symptoms increased for students receiving free or reduced-price lunch (i.e., a marker for low SES) as compared to those not receiving subsidized lunch. Families with low SES often have difficulty navigating the school system as many teachers and school administrators believe that low-income parents are not invested in their children, are unable to assist with homework, do not promote academic achievement, and do not value education [111]. This may result in high levels of parental frustration and negative parental attitudes towards school, which could in turn cause adolescents to view school negatively as well. Indeed, many lower SES students also have difficulty interacting with teachers because these students often have weak basic academic skills and are rated by teachers as having a less pleasing appearance in comparison with higher SES students [112]. Parental difficulty at school, coupled with this student income-based discrimination, could foster low school satisfaction in students, which has been associated with high levels of depression in youth [48], a finding that was replicated in our study.

In terms of racial and ethnic differences in the outcome variables, our results were in partial accordance with hypothesis 2 and indicated being African American or Native American was associated with reported increases in self-esteem, but was not associated with reported levels of depressive symptoms. Because our sample included nearly equal percentages of African American, Native American, and White adolescents, we speculate that the substantial number of minority students promoted a feeling of solidarity and cohesion among the African American and Native American students, which translated into a sense of belonging and increased self-esteem. Indeed, research indicates that African American students attending primarily African American schools reported higher self-esteem as compared to their White counterparts [113]. Another potential explanation for the racial/ethnic differences we found in self-esteem is that African American and Native American adolescents may have a stronger sense of racial/ethnic identity than Caucasian adolescents. This explanation is supported by research that has shown people of color generally scored higher on measures of ethnic identity than White individuals [114] and ethnic identity was positively related to self-esteem [56]. Therefore, as compared with White youth in our sample, African

American and Native American youth might have had higher levels of ethnic identity that led to higher self-esteem. Indeed, in the current analysis, the probability of reporting high self-esteem was greater for those students who reported high levels of ethnic identity. It does not appear that ethnic identity was related to depressive symptoms in the current sample and this mirrors one study of American Indian youth that found no relationship between these two constructs [52].

In line with hypothesis 4, high levels of parent–child conflict were a serious risk factor associated with high levels of depressive symptoms and low levels of self-esteem. The negative effects of parent–child-conflict on symptoms of depression exceeded the positive effects of parent support, illustrating the damage of familial conflict on the psychological functioning of rural youth. Although adolescents spend increasing amounts of time with their peer group, these results indicate that family interactions continue to exert influence on adolescent depressive symptomology and self-esteem. This suggests the utility of family relationship enhancement models in rural areas to help parents and adolescents communicate and resolve lingering conflict.

Hypothesis 3 and 4 regarding stressful microsystem social interactions and social support were partially supported; the detrimental impact that negative peer relationships and behavior had on adolescents' depressive symptoms exceeded the positive impact that peer support had on this mental health outcome. Specifically, negative friend behavior and negative peer interactions were associated with high levels of reported depressive symptoms and high levels of reported friend support did not mitigate these negative consequences. This finding points to the critical importance of interventions that ameliorate the harmful effects of negative peer interactions.

Another source of potential support may come from one's religious beliefs and community. In partial support of hypothesis 3, students who reported that religion was important to them had a higher probability of reporting a high level of self-esteem. It is reasonable to assume that a high level of religious orientation equates with involvement in a religious community. Although past research on the impact of religious participation is mixed, the current findings suggest that in this sample, religion was associated with self-esteem. Religious communities provide support and a sense of belonging that could serve to increase self-esteem.

In general, school characteristics did not significantly impact levels of depressive symptomology or self-esteem in rural youth. Contrary to hypothesis 5, school size was not significantly related to the outcome variables. In fact, only two school characteristics, teacher turnover rate and percent of students receiving free or reduced price lunch, were associated with symptoms of depression. Specifically, as the teacher turnover rate increased, the probability of reporting high levels of depressive symptoms decreased. This could indicate a degree of optimism in change. Perhaps students were excited by the prospect of having new teachers who have fresh ideas and different ways of running the classroom. More research is needed to confirm this speculation. Further, there are a variety of reasons that teachers may leave a job (e.g., career change, better teaching offer at another school, burnout) and each of these reasons may have different meanings for the student body. Further research is needed to gain additional insight into how teacher turnover influences student mental health.

The probability of reporting high levels of depressive symptoms was significantly lower for students who attended schools with a high percentage of students receiving subsidized lunch. Although individuals who received subsidized lunch were at risk for high levels of depressive symptoms, it seems that when low income students were surrounded by other students who received subsidized lunches, low SES became the norm. Low SES adolescents surrounded by peers from a similar SES might feel protected from negative social judgments about their economic situation.

Finally, perceived discrimination was related to higher levels of depression, but was not significantly associated with self-esteem. This shows the dynamic importance of considering different ecological levels in adolescent developmental research. Discrimination is a macrosystem risk factor that reverberates through meso- and microsystem interactions and proximal processes. It is likely that perceiving discrimination triggers awareness of a poor fit between the individual and parts of his or her environment. Depression can consequently result from feeling estranged and unwanted within the ecological system.

Limitations

This study's findings must be understood in light of specific limitations. A four-item scale was used to measure depressive symptoms and a five-item scale to measure self-esteem. Although the scales we used were reliable and empirically validated [97, 99], depression and self-esteem are complex constructs. The depression scale does not evaluate clinical levels of depression; it measures depressive symptoms. Thus, including more comprehensive measures of depression and self-esteem would have strengthened our study. However, this was not possible given the time constraints around administration of the SSP+ survey (i.e., surveys were completed during the school day, in school computer labs).

Even though researchers took every precaution to make the survey a confidential experience, it is possible that

students were influenced by the presence of peers and were not entirely honest in their responses, thus influencing the results. Ideally, participants should complete surveys in private rooms; however, this arrangement was not possible for such a large sample given financial and time constraints. In addition, it would have been helpful if we had been able to conduct analysis to determine how the presence of peers influenced our findings, but this was beyond the scope of the current study. Despite this concern, adult monitors were present throughout the survey administration and did not allow students to talk about the questions. Consequently, we believe that the presence of peers had minimal impact on how students answered the survey.

The study employed a listwise deletion of missing data that resulted in a loss of 21.2 % of the original sample, which is a limitation. This approach may reduce the study's external validity as there is a discrepancy between the sample analyzed and the full sample. As is typical in many large studies, higher risk adolescents were more likely to have missing data. Thus, model effects may be biased downward, underestimating the true impact of the risk and protective factors under consideration. Having violated the Missing At Random assumption that guides many multiple imputation techniques, listwise deletion, although less than optimal, was the best available strategy for handling missing data [109].

Summary

The current research augments the scant literature on rural youth by addressing ecological characteristics and proximal processes that influence depressive symptoms and self-esteem. Being female, having a low income, and having negative relationships with parents and peers are risk factors that increase the likelihood of experiencing high levels of depressive symptoms and low levels of self-esteem. Macrosystem discrimination also is a risk factor for adolescent depression, but is not related to self-esteem. In contrast, supportive parents and peers, religious orientation, ethnic identity, and school satisfaction are protective factors that increase youths' likelihood of having low levels of depressive symptoms and high self-esteem. This research highlights the importance of individual, family, and school characteristics in protecting rural youth from depression and increasing their self-esteem, reinforcing the importance of an ecological approach. Clearly, targeted interventions should not only focus on strengthening individual characteristics, but also focus on strengthening youths' social support systems, especially positive adult relationships such as the parent–child relationship.

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