



potentially associated with aggressive behavior, it is incumbent upon researchers to investigate specific risks and assets across multiple ecological levels that are associated with aggressive behavior in youth. It is especially important for this research to be conducted in rural areas because there is a lack of research on health-related risk and protective factors in rural communities (Robbins, Dollard, Armstrong, Kutash, & Vergon, 2008). Further, rural youth are a vulnerable group and, compared with urban and suburban youth, are more likely to use tobacco, alcohol, and drugs, bring a weapon to school, drop out of school (Provasnik et al., 2007), and report high rates of school misbehavior and low rates of school belongingness (Witherspoon & Ennett, 2011). The higher rates of risky behavior in rural youth might put them at risk for participation in aggressive acts. Given the lack of research on rural adolescents coupled with the higher rates of risky behavior in this population, it is vital for researchers to examine what demographic, psychological, social, and environmental factors affect rates of aggression in rural youth: this is the goal of the current study.

### **Ecological Theory and Social Capital Formation**

The current study used a dual framework of ecological systems theory from psychology and social capital theory from sociology to understand the risks and assets associated with aggressive behavior. Ecological systems theory provides a comprehensive understanding of human development by viewing development across multiple environments (Bronfenbrenner, 1979). This theory takes into account micro-, meso-, and macro-systems across social environments.

Social capital is ecological in nature as it focuses on the benefits gained from social relationships across multiple environments (e.g., home, school) and social groups (e.g., family, peer group; Putnam, 2000). Social capital is the mutual benefit that drives people to maintain social networks and "...refers to features of social organization such as networks, norms, and social trust that facilitate coordination and cooperation for mutual benefit" (Putnam, 1995, p. 67). Social capital provides individuals with access to economic, cultural, and social resources embedded within various ecological microsystems such as the family, school, and work place (Dika & Singh, 2002; Portes, 1998).

Both frameworks indicate that positive proximal processes foster engagement and social capital formation in the adolescent's ecological system, leading to healthy social functioning. Conversely, negative and conflicted proximal processes result in the erosion of social capital and can lead to greater incidence of aggression (e.g., Smokowski, Cotter, et al., 2013). Both

ecological and social capital theories highlight the importance of the macrosystem (e.g., community, culture) as environmental influences that impact adolescent development and behavior, such as aggression. However, past research found that distal microsystems (e.g., school and neighborhood factors) tended to be less influential than the proximal processes in microsystems (Smokowski, Cotter, et al., 2013; Smokowski, Robertson, Cotter, & Guo, 2013). These two frameworks create a clear developmental story: (i) adolescents embedded and engaged within ecological systems are nurtured and protected by positive proximal processes (i.e., social interactions), resulting in the formation of social capital and healthy functioning (measured in the current study by low rates of aggression) and (ii) adolescents blocked from positive proximal processes across various ecological systems become disengaged, have minimal social capital, and manifest problematic behavior such as aggression.

### **Demographic Variables That Influence Aggression**

It is well documented that in adolescence and adulthood, males are more physically aggressive than females (Frisell, Pawitan, Langstrom, & Lichtenstein, 2012; Peterson, Esbensen, Taylor, & Freng, 2007; Topitzes, Mersky, & Reynolds, 2012; Zheng & Cleveland, 2013). This trend begins in early childhood (Baillargeon et al., 2007; McEachern & Snyder, 2012) and continues into adolescence when boys committed significantly more violent crimes than girls (Zimmerman & Messner, 2010).

In addition to gender differences in rates of aggressive and violent behavior, there are also racial/ethnic differences. In one sample of 5,935 students ages 13–15, compared to White students, African-American and Native American students were twice as likely to report having shot at someone, engaged in serious violent offending, and attacked someone with a weapon (Peterson et al., 2007). In the same sample, Native American youth were 2.36 times more likely than White youth to have participated in a gang fight. Although these prevalence rates might suggest significant racial differences in aggressive behavior, these differences could be due to factors other than race, such as poverty, school, or neighborhood characteristics (e.g., Smokowski, Robertson, et al., 2013). Although prevalence rates have suggested racial disparities in aggressive behavior, more research is needed in the ecological transactions and social capital of minority groups to understand factors that foster these differences.

In terms of age, aggression is common during early childhood and generally decreases into late childhood and throughout adolescence (Bongers, Koot, van der

Ender, & Verhulst, 2003; Miner & Clarke-Stewart, 2008; Williams et al., 2009). In regard to socioeconomic status, poverty has been associated with an increased risk for aggressive behavior. In one study, current level of poverty predicted children's aggressive (or externalizing) behavior (McLeod & Shanahan, 1993). Poverty or limited financial resources are often associated with lone parenthood and in one study, youth from lone parent families tended to have higher rates of aggression (Vaden-Kiernan, Ialongno, Pearson, & Kellam, 1995).

### **Social Capital, Positive Proximal Processes, and Mental Health Functioning**

The term "ethnic identity" refers to an individuals' self-identification with an ethnic group (Bernal & Knight, 1993) and the individuals' degree of connection with that ethnicity (Phinney, Horenczyk, Liebkind, & Vedder, 2001). A strong ethnic identity serves as a form of social capital as it has the potential to provide adolescents with a sense of group membership and belonging and, therefore, might serve as a protective factor. Indeed, ethnic identity has been associated with successful psychological functioning (Phinney, 1990) such as lower levels of depression (Kiang, Witkow, & Champagne, 2013), anxiety (Tynes, Rose, Anderson, Umaña-Taylor, & Lin, 2012), and aggression (Flanagan et al., 2011; Holmes & Lochman, 2008).

Religious orientation is another form of social capital that might buffer against aggression. It refers to the importance that an individual places on religion and participation in religious activities. Religious institutions are often tight knit and supportive communities that enhance members' well-being. Thus, high religious orientation may serve as a form of social capital that enhances adolescent development. Indeed, researchers have reported that participation in religious activities and a belief in the importance of religion were associated with increased self-esteem (Le, Tov, & Taylor, 2007) and decreased aggression (Hollister-Wagner, Foshee, & Jackson, 2001; Leach, Berman, & Eubanks, 2008).

Support from parents represents a positive proximal process in the family microsystem that also serves as an important source of social capital for youth. Parenting practices influence adolescent behavior, including aggression. However, the majority of extant studies have examined how negative parenting practices impact aggressive behavior and few studies have addressed the impact of positive parenting, such as support and nurturance (Arim, Dahinten, Marshall, & Shapka, 2011). Supportive parents are engaged and invested in their children's lives and likely monitor their activities and friends. Parental monitoring, a form of parent support, was inversely associated with aggressive behavior: youth with low levels of parental monitoring reported

aggression scores almost three times higher than youth with high levels of parental monitoring (Orpinas, Murray, & Kelder, 1999).

Although parents continue to exert influence on adolescent development, peers are particularly influential figures and peer support is a positive proximal process that serves as an important form of social capital for adolescents. High levels of peer support are likely to denote the presence of friendship, which can serve as a protective factor by preventing loneliness, buffering against the negative effects of family stress, and increasing feelings of self-worth (Bagwell & Schmidt, 2011). In a sample of urban African-American youth, support from friends was significantly associated with lower rates of teacher-rated aggression; however, support from classmates (peers who were not labeled as friends) was not associated with teacher, peer, or self-reports of aggressive behavior (Benhorin & McMahon, 2008). These findings suggest that in order for peer support to impact rates of aggression, the peer must be considered a friend.

In addition to parent and friend support, the presence of teacher support is another positive proximal process and important form of social capital that enhances youths' positive experiences in the school microsystem. For example, perceived teacher support was associated with increased academic motivation and more positive perceptions of school (Frey, Ruchkin, Martin, & Schwab-Stone, 2009). Teacher support might also buffer against aggressive behavior. In one study of 127 African-American youth ages 10–15, self-reported teacher support was significantly associated with lower levels of teacher reported aggression, but was not associated with peer or self-reported aggression (Benhorin & McMahon, 2008). This finding suggested that youth who feel supported by their teachers, might display more positive behavior in the classroom, but additional research is needed.

School satisfaction denotes positive experiences in the school microsystem. Previous research on impoverished, rural youth indicated that higher school satisfaction was associated with a lower probability of reporting high levels of aggressive behavior by 58% (Smokowski, Cotter, et al., 2013). If youth feel connected and satisfied with school, they are likely to be engaged in classes and activities and have little time to commit aggressive acts.

Future optimism indicates healthy mental health functioning and enhances youths' ability to make social connections. Future optimism refers to a personal assessment of how well one can overcome the challenges embedded in the ecological social system and is often the catalyst for youth to set goals, form plans, and make commitments (Nurmi, 1991; Seginer, 2008). Future optimism bolstered mental health

functioning for vulnerable adolescents (McCabe & Barnett, 2000; Polgar & Auslander, 2009) and was also associated with lower aggression (Benson, 2007). For instance, in a sample of rural adolescents future optimism was significantly and negatively associated with aggression (Smokowski, Evans, Cotter, & Webber, 2013).

### **Erosion of Social Capital, Negative Proximal Processes, and Mental Health Problems**

Parent–adolescent conflict is a negative proximal process that represents an erosion of social capital and has been associated with increased adolescent aggression (Edwards, Barkley, Laneri, Fletcher, & Metevia, 2001; Eichelsheim et al., 2010; Low & Stocker, 2005). For instance, in an investigation of parenting and youth outcomes using structural equation modeling, parent–adolescent “dyadic hostility” (i.e., conflict) was directly and significantly associated with adolescent aggression (Buehler, 2006).

In addition to parent–adolescent conflict, conflict-ridden peer relationships are another example of a negative proximal process present in adolescents’ lives that erodes social capital. For example, association with aggressive and delinquent peers has been identified as a consistent predictor of aggressive behavior (Espelage, Holt, & Henkel, 2003; Ferguson, Miguel, & Hartley, 2009). The salience of adolescent relationships may also lead to peer reinforcement of behavior, which might result in more frequent or intense aggression. This reinforcement is known as peer pressure. In addition to association with delinquent peers and peer pressure, friend rejection also led to aggressive behavior over a three year period (Dodge et al., 2003).

Negative peer relationships often result in bullying victimization and negative school experiences. Victimization represents a negative proximal process that erodes social capital. Bullying victimization is a specific form of victimization characterized by power imbalance, repetition, and intent to harm (Olweus, 1993). A number of studies have found that bullied youth have higher rates of aggression than youth not involved in the bullying dynamic (Camodeca & Goossens, 2005; Salmivalli & Nieminen, 2002). In light of these past findings, it follows that suffering from negative social transactions in the form of school hassles (e.g., being teased, being ignored) would also be associated with elevated rates of aggression.

Poor mental health functioning has been associated with higher levels of aggression. For example, several empirical studies have reported an association between internalizing symptoms and aggression (e.g., Crick, Ostrov, & Werner, 2006; Kofler et al., 2011; Marsee, Weems, & Taylor, 2008). In a longitudinal study from

late childhood to early adolescence, researchers found that initial levels of internalizing and externalizing behavior were correlated and that early depressive symptoms predicted increases in externalizing behavior over time (Zimmerman, Schutte, Taskinen, & Koller, 2013). This finding supports the “acting out” model in which early irritability, a characteristic of depression, leads to aggression and rule breaking (Kofler et al., 2011).

### **Distal Microsystem Influences: School and Neighborhood Characteristics**

School characteristics impact the school culture and climate, which, in turn impacts adolescent behavior, such as aggression. Youth often feel less safe in larger schools (Lleras, 2008) perhaps due to the fact that larger schools had higher rates of violence (Ferris & West, 2008), crime (Chen, 2008), and vandalism (Walker & Gresham, 1997) than smaller schools. Academic achievement is another important school characteristic associated with aggression. One study found that every one unit increase in grades (e.g., B to A) reduced the likelihood of criminal victimization by 17% (Wynne & Joo, 2010); thus, high academic performance might be related to other forms of aggression in addition to criminal victimization. Rates of poverty within a school have also been associated with aggression. Indeed, elementary schools with a high number of students who received free or reduced price lunch reported higher rates of aggression in the form of bullying (Bradshaw, Sawyer, & O’Brennan, 2009).

Neighborhood characteristics have been associated with several developmental outcomes for adolescents, including aggression. For example, African-American youth living in low-SES neighborhoods displayed more self-reported aggression than African-American youth living in middle-SES neighborhoods (Kupersmidt, Griesler, DeRosier, Patterson, & Davis, 1995).

### **Hypotheses for Current Study**

The overarching thesis for the current study was that youth who had high levels of social capital through positive proximal processes across various levels of their ecology (i.e., family, peer group, school) would report low levels of aggression, while youth who experienced negative proximal processes and disengaged from their ecology would exhibit high levels of aggression. Based on existing research, we tested the following hypotheses: (i) Aggression would decrease over time; (ii) living in a two-parent family would be negatively associated with aggression (i.e., protective factor), receiving free or reduced price lunch would be positively associated with aggression (i.e., risk factor), aggression would decrease with age, and boys would display higher rates of

aggression compared to girls. (iii) In terms of social capital, positive proximal processes, and mental health functioning, ethnic identity, religious orientation, parent, friend, and teacher support, school satisfaction, and future optimism would be protective factors inversely associated with aggression; (iv) negative proximal processes assessed by parent–adolescent conflict, school hassles, bullying victimization, friend rejection, peer pressure, delinquent peers, and internalizing symptoms would be risk factors positively associated with aggression; (v) in terms of school characteristics, a larger school size, a high percentage of youth receiving free or reduced lunch, a high percentage of African-American and American-Indian students, a low percentage of students at or above grade level in reading and math, a high teacher turnover rate, and a high number of suspensions would be risk factors associated with higher levels of aggression; (vi) in terms of neighborhood characteristics, a high percentage of residents 25 and older with no high school diploma and a high percentage of single, female headed households would be risk factors associated with higher levels of aggression.

Given the mixed research on race (e.g., that factors other than race might impact the higher rates of aggression in minority youth), we used this study as a means of exploring additional mechanism that account for this relationship.

## METHODS

### Current Study

The NC-ACE Rural Adaptation Project (RAP) is a 5-year longitudinal panel study of more than 4,000 middle-school students from 28 public middle schools and 12 public high schools in two rural, economically disadvantaged counties in North Carolina. The current sample came from the RAP study and the data were collected in spring of 2011, spring of 2012, and spring of 2013 (i.e., years 1, 2, and 3 of the 5-year project). In year 1, all middle-school students in Grades 6 through 8, a complete census in County 1, were included in the sample. In accordance with school district policies, County 1 adopted the assessment as part of normal procedures and all students were given the opportunity to participate in the study. Because County 2 was geographically bigger with a larger student population, a random sample of 40% of middle-school students were included from County 2. Parents in County 2 received a letter explaining the study and if they did not want their child to participate, they returned the letter requesting non-participation and their child was removed from the study roster. Students were tracked longitudinally as they moved through middle school and into high school and each year a new, random sample of sixth graders

from County 2 and the entire new sixth grade class from County 1 was added to the sample. Thus, the year 2 sample comprised students in Grades 6 through 9 and the year 3 sample comprised students in Grades 6–10. The participation rate was approximately 92% in year 1, 81% in year 2, and 84% in year 3.

An identical data collection procedure was used in both counties and data were collected using an online assessment tool. Prior to filling out the online assessment, all participants were advised that participation was voluntary and they were free to decline; students assented to participate by reading and electronically signing an assent screen. Assessments were filled out in school computer labs closely monitored by research staff. Each participant was given a unique identification number in order to maintain confidentiality. IRB approval was obtained from the University of North Carolina.

In the current study, we aimed to analyze students' change in aggression over a 2-year study period based on three-wave panel data. Only students who provided data for at least two waves were included in the analysis, thus students who entered the study at Wave 3 were excluded.

### Participants

Characteristics of the sample are displayed in Table III. The final analytic sample comprised 4,065 observations at baseline, 4,251 observations of Wave 2 or 12 months after the baseline, and 4,256 observations at Wave 3 or 24 months after the baseline. The racially/ethnically diverse sample mirrored the surrounding community: 27% of participants identified as White, 23% as African-American, 28% as American-Indian, 14% as mixed race/other, and 8% as Latino. About half of the sample (52%) was female, 85% of participants resided in a two-parent family, and 86% received free or reduced price lunch.

### Measures

The school success profile (SSP; Bowen & Richman, 2008) is a 220-item youth self-report that measures perceptions and attitudes about school, friends, family, neighborhood, self, and health and well-being. The reliability and validity of the SSP have been well documented given that it has been administered to tens of thousands of students since its creation in 1993 (Bowen, Rose, & Bowen, 2005). The current study used a modified version of the SSP, the school success profile plus (SSP+), which included 152 of the SSP items and four additional subscales: (i) a modified version of the Rosenberg self-esteem scale (Rosenberg, 1965); (ii) the multigroup ethnic identity measure (Phinney & Ong, 2007); (iii) subscales from the youth self-report (YSR), which is the adolescent version of the child behavior

TABLE I. Description of Measures

Measure	Type	HLM Level	Alpha		Response Options	Example Items
			(year 1; year 2; year 3)	(year 1; year 2; year 3)		
Aggression (12 items)	Dependent	1 (time)	.86; .87; .86	.86; .87; .86	Not like me; a little like me; a lot like me	"I get in many fights" and "I break rules at home, school, or elsewhere"
Internalizing symptoms (7 items)	Independent	1 (time)	.89; .90; .91	.89; .90; .91	Not like me; a little like me; a lot like me	"I often feel sad" and "I often feel nervous or tense"
Parent-adolescent conflict (10 items)	Independent	1 (time)	.82; .83; .84	.82; .83; .84	True; false	"At least three times a week, my parent(s) and I get angry at each other" and "My parent(s) put me down"
Friend rejection (3 items)	Independent	1 (time)	.70; .74; .75	.70; .74; .75	Not like me; a little like me; a lot like me	"I am made fun of by my friends" and "I wish my friends would show me more respect."
School hassles (13 items)	Independent	1 (time)	.90; .92; .92	.90; .92; .92	Never; once or twice; more than twice	"Someone treated you in a disrespectful way" and "Someone at school pushed, shoved, or hit you"
School satisfaction (7 items)	Independent	2 (student)	.84; .85; .87	.84; .85; .87	Not like me; a little like me; a lot like me	"I enjoy going to this school" and "I get along well with teachers at this school"
Ethnic identity (6 items)	Independent	2 (student)	.92; .93; .94	.92; .93; .94	Strongly disagree; disagree; neither agree nor disagree; agree; strongly agree	"I have a strong sense of belonging to my own ethnic group," and "I feel a strong attachment towards my ethnic group"
Religious orientation (3 items)	Independent	2 (student)	.88; .91; .92	.88; .91; .92	Not like me; a little like me; a lot like me	"My religious faith gives me strength" and "My religious faith influences the decisions I make"
Parent support (5 items)	Independent	2 (student)	.89; .92; .93	.89; .92; .93	Never; once or twice; more than twice	"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?"
Friend support (5 items)	Independent	2 (student)	.89; .91; .92	.89; .91; .92	Not like me; a little like me; a lot like me	"I can count on my friends for support" and "I can trust my friends"
Teacher support (8 items)	Independent	2 (student)	.88; .90; .92	.88; .90; .92	Strongly disagree; disagree; agree; strongly agree	"My teachers care about me" and "My teachers give me a lot of encouragement"
Future optimism (12 items)	Independent	2 (student)	.88; .90; .92	.88; .90; .92	Strongly disagree; disagree; agree; strongly agree	"When I think about my future, I feel very positive" and "I see myself accomplishing great things in life"
Bullying victimization (1 item)	Independent	2 (student)	N/A	N/A	Yes; no	During the past 12-months, have you ever been bullied on school property?"
Delinquent friends (9 items)	Independent	2 (student)	.90; .91; .91	.90; .91; .91	Not like me; a little like me; a lot like me	"I have friends who get in trouble with the police" and "I have friends who cut classes."
Peer pressure (5 items)	Independent	2 (student)	.73; .77; .79	.73; .77; .79	Not like me; a little like me; a lot like me	"I let my friends talk me into doing things I really don't want to do" and "I tend to go along with the crowd."

**TABLE I. (Continued)**

Measure	Type	HLM Level	Alpha		Response Options	Example Items
			(year 1; year 2; year 3)			
School size	Independent	3 (school)	N/A		Number of students	N/A
School poverty	Independent	3 (school)	N/A		Percentage students who receive free/reduced lunch	N/A
Racial composition	Independent	3 (school)	N/A		Percentage of American-Indian/African-American	N/A
At or above grade level in reading/math	Independent	3 (school)	N/A		Percentage	N/A
Teacher turnover	Independent	3 (school)	N/A		Percentage	N/A
Short-term, out of school suspensions	Independent	3 (school)	N/A		Percentage	N/A
Residents (25+) without high school diploma	Independent	3 (school)	N/A		Percentage	N/A
Single female-headed households	Independent	3 (school)	N/A		Percentage	N/A

checklist (Achenbach & Rescorla, 2001); and (iv) the conflict behavior questionnaire (CBQ; Prinz, Foster, Kent, & O’Leary, 1979). The SSP+ is the source of all independent and dependent variables in the current study.

Aggression and internalizing symptoms were measured using modified subscales from the YSR (Achenbach & Rescorla, 2001). Parent–adolescent conflict (family microsystem) was measured using 10 of the 20 items from the CBQ (Prinz et al., 1979). Extensive measurement analysis illustrated that the shortened version of the CBQ functions as well as the full version and this truncated version of the CBQ has been used extensively in previous publications (e.g., Evans, Smokowski, & Cotter, 2014; Smokowski, Cotter, et al., 2013; Smokowski, Evans, Cotter, Guo, 2013; Smokowski et al., 2014). Friend rejection (peer microsystem), school hassles (school microsystem), school satisfaction (engagement with school microsystem), religious orientation (engagement at church), parent support (engagement with family), friend support (engagement with peers), teacher support (engagement at school), future optimism, delinquent friends, and peer pressure were measured with SSP scales (Bowen & Richman, 2008). Ethnic identity (engagement with culture) was measured with the multigroup ethnic identity measure (MEIM; Phinney & Ong, 2007). Modeled after the youth risk behavior survey (Center for Disease Control and Prevention, 2014), bullying victimization was measured by a dichotomous variable that provided participants with a detailed definition of bullying and then asked: “During the past 12-months, have you ever been bullied on school property?” This one item measure is frequently used in bullying research (e.g., Cross et al., 2011; Joronen, Konu, Rankin, & Astedt-Kurki, 2011) and although this question did not allow an approximation of the frequency of bullying, it permitted an assessment of whether or not youth had experienced bullying victimization. Additional information on type of variable (independent/dependent), HLM level, Cronbach’s alpha coefficients across years, and example items are displayed in Table I. As illustrated in Table I, one variable from each ecological microsystem level was chosen to serve as a time varying covariate. Based on past research and previous NC-ACE RAP studies (e.g., Smokowski, Guo, Rose, Evans, Cotter, & Bacallao, 2014; Smokowski, Cotter, et al., 2013), we concluded that these variables were the strongest risk factors and, therefore, captured negative microsystem transactions. See Table II for a correlation matrix of all scales used in year 1.

School level variables were obtained from administrative and census data. Census variables (i.e., percentage of residents age 25 or older without a high

TABLE II. Inter-Correlation Matrix of Year 1 Scales

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Aggression	1.000													
2. Internalizing symptoms	0.545	1.000												
3. Parent-adolescent conflict	0.469	0.540	1.000											
4. Friend rejection	0.235	0.332	0.227	1.000										
5. School hassles	0.357	0.439	0.310	0.408	1.000									
6. School satisfaction	-0.366	-0.277	-0.288	-0.164	-0.322	1.000								
7. Ethnic identity	-0.140	-0.081	-0.161	0.004	-0.030	0.238	1.000							
8. Religious orientation	-0.176	-0.134	-0.195	-0.046	-0.057	0.259	0.369	1.000						
9. Parent support	-0.256	-0.349	-0.552	-0.142	-0.164	0.288	0.224	0.260	1.000					
10. Friend support	-0.117	-0.147	-0.136	-0.253	-0.178	0.409	0.195	0.211	0.260	1.000				
11. Teacher support	-0.211	-0.157	-0.230	-0.116	-0.175	0.465	0.252	0.218	0.266	0.257	1.000			
12. Future optimism	-0.201	-0.185	-0.221	-0.104	-0.091	0.316	0.290	0.292	0.275	0.234	0.416	1.000		
13. Delinquent friends	0.540	0.347	0.347	0.217	0.279	-0.303	-0.093	-0.162	-0.213	-0.138	-0.202	-0.153	1.000	
14. Peer pressure	0.295	0.318	0.237	0.492	0.289	-0.120	-0.022	-0.065	-0.107	-0.091	-0.087	-0.127	0.271	1.000

school diploma and percentage of families with single female-headed households) characterized the census tract surrounding the participant’s school and were not linked to the students’ home addresses.

In addition, demographic variables included gender (male was the reference group) and age at baseline measured in years. Race was coded as four dichotomous variables Hispanic, African-American, American-Indian, and Mixed race (White students were the reference group), receipt of free or reduced price lunch was used as a proxy for poverty (*No* was the reference group), and family structure was dichotomized as a two-parent household or another type of family situation, which was the reference group.

**ANALYTIC PLAN**

First, multiple imputation analyses were completed to minimize the impact of missing data, which could occur due to participant non-response to questions or due to attrition from the sample over time. We first tested the null hypothesis that the data were missing completely at random (Little, 1988), and this test was rejected. An imputation model with more than 70 variables was used to fill in the missing values. Subsequent HLM analyses were based on the 10 and 20 imputed files generated in the multiple imputation. The findings presented in Table III are aggregated results using Rubin’s rule (Little & Rubin, 2002). The two sets of findings using 10 and 20 imputed files were very similar, indicating that our results are consistent and are not sensitive to potential problems that might arise from low relative efficiency caused by the use of fewer imputed files. Given this, the following summary is based on the results from the analysis of the 10 imputed files only.

Based on findings of prior research, we performed one-tailed tests on independent variables for which the direction of impact was known, and two-tailed tests on independent variables for which the direction of impact was unclear. Because the results shown in the table are exp(B) or exponentiations of estimated coefficients, a value of exp(B) that is greater than one indicates a positive sign of the coefficient, whereas a value of exp(B) that is less than one indicates a negative sign of the coefficient. As such, we use “+ or exp(B)>1” to indicate hypotheses about a positive sign of estimated coefficient, “- or exp(B)<1” to indicate hypotheses about a negative sign of estimated coefficient, and a blank to indicate non-directional hypotheses.

The study dataset had a typical nesting structure; study times (i.e., three waves or occasions) were nested within students, and students were nested within schools. To correct for the clustering effects and address the violation of the independent-observation assumption



**TABLE III. Descriptive Statistics and Exponentiated Coefficients for ln(Aggression)**

Fixed and Random Effects	Hypothesized Sign [exp(B) > or < 1]	Baseline Descriptive Statistics		Estimation Based on 10 Imputed Files	
		% or Mean	SE	Exp(B)	SE
<b>Fixed effect</b>					
Level 1: time					
Time (months since baseline)	– or EXP(B) < 1			1.000	0.000
School hassles (time-varying)	+ or EXP(B) > 1	1.50	0.007	1.063***	0.004
Internalizing behavior (time-varying)	+ or EXP(B) > 1	1.44	0.008	1.193***	0.004
Parent–adolescent conflict (time-varying)	+ or EXP(B) > 1	2.04	0.039	1.013***	0.001
Peer rejection (time-varying)	+ or EXP(B) > 1	1.29	0.007	1.023***	0.004
Level 2: individual					
Race (White)					
African-American		0.23	0.007	1.012	0.006
Hispanic		0.08	0.004	0.970***	0.009
Native American		0.28	0.007	1.005	0.007
Mixed race and other		0.14	0.005	1.011	0.007
Gender (male)					
Female	– or EXP(B) < 1	0.52	0.008	1.015***	0.004
Age at baseline	– or EXP(B) < 1	12.80	0.017	1.003	0.002
Receipt of free/reduced lunch (No)					
Yes	+ or EXP(B) > 1	0.86	0.006	0.999	0.006
Family structure (other)					
Two-parent family	– or EXP(B) < 1	0.85	0.006	0.979***	0.006
Ethnic identity	– or EXP(B) < 1	3.33	0.013	0.991**	0.003
Religious orientation	– or EXP(B) < 1	2.31	0.009	0.980***	0.004
School satisfaction	– or EXP(B) < 1	2.36	0.008	0.948***	0.005
Bullying victimization	+ or EXP(B) > 1	0.23	0.007	0.964	0.005
Future optimism	– or EXP(B) < 1	3.46	0.008	0.997	0.005
Parent support	– or EXP(B) < 1	2.67	0.008	1.018	0.005
Teacher support	– or EXP(B) < 1	3.15	0.009	1.007	0.004
Friend support	– or EXP(B) < 1	2.47	0.009	1.024	0.004
Delinquent friends	+ or EXP(B) > 1	1.39	0.007	1.124***	0.005
Peer pressure	+ or EXP(B) > 1	1.31	0.006	1.018**	0.006
Level 3: school and neighborhood					
School size	+ EXP(B) > 1	508.69	3.689	1.000	0.000
% of students receiving free/reduced lunch	+ EXP(B) > 1	77.55	0.153	1.000	0.000
% of American-Indian students in school	+ EXP(B) > 1	31.92	0.475	1.000	0.000
% of African-American students in school	+ EXP(B) > 1	27.92	0.287	1.000	0.000
% School students at grade level in reading	– EXP(B) < 1	57.91	0.145	1.000	0.000
% School students at grade level in math	– EXP(B) < 1	75.29	0.111	1.000	0.001
% of Teacher turnover	+ EXP(B) > 1	11.31	0.141	1.000	0.000
Short-term out of school suspensions per 100 students	+ EXP(B) > 1	38.93	0.360	1.000	0.000
% of residents age 25+ with 9th–12th grade education no diploma	+ EXP(B) > 1	16.68	0.089	1.001*	0.001
% of family households with single female head, no husband	+ EXP(B) > 1	21.52	0.117	0.999	0.000
Intercept				0.793***	0.060
Random effect (variance component)					
Level 3 intercept				0.000	
Level 2 intercept				0.011***	
Model Wald $\chi^2$ (df) shown by one imputed file				8452.47(33)***	
Number of students					
At wave 1 (time = 0 month)				4056	
At wave 2 (time = 12 months)				4251	
At wave 3 (time = 24 months)				4256	
Number of schools at wave 1 (time = 0 month)				28	

Note. Reference group for categorical variables is shown in parentheses after variable name.

\* $P < .05$ , \*\* $P < .01$ , \*\*\* $P < .001$ , one-tailed for directional hypothesis or two-tailed for non-directional hypothesis test.

embedded in a linear regression model, we applied three-level hierarchical linear modeling (HLM) to the data analysis. The three-level HLM is shown by the following combined equation:

$$\begin{aligned} \ln(Y_{tij}) = & \gamma_{000} + \gamma_{000}(\text{Time})_{tij} + \sum_{p=2}^P \gamma_{p00}(TV)_{ptij} \\ & + \sum_{q=1}^Q \gamma_{0q0}(X)_{qij} + \sum_{r=1}^R \gamma_{00r}(W)_{rj} + u_{00j} \\ & + r_{0ij} + e_{tij} \end{aligned}$$

where  $\ln(Y_{tij})$  is the outcome variable of interest,  $(\text{Time})_{tij}$  is the time variable measured in months from baseline or Wave 1,  $(TV)_{ptij}$  are P-1 time-varying variables,  $(X)_{qij}$  are Q student-level variables,  $(W)_{rj}$  are R school-level variables,  $r_{0ij}$  is a random effect for the  $i$ th student from the  $j$ th school,  $u_{00j}$  is a random effect for the  $j$ th school, and  $e_{tij}$  is a residual term incorporating temporal random effect for the  $i$ th student from the  $j$ th school at time  $t$ .

Specifications of the three-level HLM are described below. First, given the skewed distribution of the outcome variable (aggression), we followed the convention in econometrics and used a natural-logarithm transformation. Second, the analysis specified a linear time variable only because quadratic or curvilinear modeling is not permitted for three-point data (Raudenbush & Bryk, 2002). A special feature, and an advantage of the current analytic model, was the use of several time-varying variables (i.e.,  $(TV)_{ptij}$  variables) in level-1. The inclusion of these time-varying variables allowed for the investigation of the relationship between a predictor and the outcome variable from a truly dynamic point of view, and therefore, best utilized the rich information offered by this panel data. The complexity of the three-level model limited the number of time-varying variables that could be included in the analysis. We chose four time-varying covariates (i.e., internalizing symptoms, parent-adolescent conflict, friend rejection, and school hassles) based on the goodness-of-fit of preliminary analyses and previous research. As such, including  $(\text{Time})_{tij}$ , the total number of predictors at level-1 is 5, or  $P=5$ .

Third, we employed 15 predictor variables at level-2 (i.e.,  $Q=15$ ), which included demographics, positive proximal processes, and negative proximal processes (measured at baseline). Fourth, at level-3, we employed 10 school-level variables (i.e.,  $R=10$ ) to incorporate the influence of macro settings on students' aggression. Although the random effects at the school level for both models were extremely small and were not statistically significant, due to the ecological conceptual model, our

final model was a three-level HLM. Further, the inclusion of a non-significant level does not negatively impact model estimation (Guo, 2005; Raudenbush & Bryk, 2002).

Finally, because the dependent variable in the final model included a natural-logarithm transformation, we presented the exponent of estimated coefficients [ $\exp(B)$ ] in tables to ease the burden of interpretation of findings. The rationale for such presentation is that we controlled for all other variables included in the model at the level of zero. Doing so, all other coefficients were cancelled out, and only the estimated intercept and slope of interest remained in the equation. Using a ratio to compare two groups of a dichotomous variable, the estimated intercept was further dropped out. Suppose  $X$  is a dichotomous predictor variable, the ratio of model-predicted outcome values for the two groups of  $X$  under the condition of controlling for all other predictor variables at the zero level is as follows:

$$\begin{aligned} \frac{Y|X=1}{Y|X=0} &= \frac{\exp(\hat{\beta}_0 + \hat{\beta}_1)}{\exp(\hat{\beta}_0)} = \exp(\hat{\beta}_0 + \hat{\beta}_1 - \hat{\beta}_0) \\ &= \exp(\hat{\beta}_1) \end{aligned}$$

where  $\hat{\beta}_0$  is model-estimated intercept and  $\hat{\beta}_1$  is model-estimated slope for variable  $X$ . Thus, we can interpret the finding of the difference between  $X=1$  and  $X=0$  on the outcome  $Y$  as the group of  $X=1$  on average had an outcome that was  $[100 - 100 * \exp(\hat{\beta}_1)]\%$  lower than the outcome of the group of  $X=0$  when  $\exp(\hat{\beta}_1) < 1$ , and the group of  $X=1$  on average had an outcome that was  $[100 * \exp(\hat{\beta}_1) - 100]\%$  higher than the outcome of the group of  $X=0$  when  $\exp(\hat{\beta}_1) > 1$ . When  $X$  is a continuous variable, we interpret the resulting quantity as  $[100 - 100 * \exp(\hat{\beta}_1)]\%$  decrease or  $[100 * \exp(\hat{\beta}_1) - 100]\%$  increase on the outcome variable when  $X$  increases by one unit.

## RESULTS

We ran a fully unconditional three-level hierarchical linear model (HLM) to partition the total variability of the outcome variable. Results showed that on the aggression score, 49.0% of the variation was due to temporal change, 49.8% was due to individual student variation, and 1.2% was due to school variation.

Sample descriptive statistics and the exponentiated coefficients of the HLM analysis using the outcome variable of  $\ln(\text{Aggression})$  are displayed in Table III. The model had an excellent fit to the data, as the model had a Wald  $\chi^2$  of 8,452.47 ( $df=33$ ) that was statistically significant at .0001 level. This statistic is based on one

imputed file, and all other 9 files of the 10 imputed files and all 20 imputed files showed similar findings. Over time, students reported, on average, slightly increased aggression scores, but the change per month was less than .01%. The change over time on the average aggression score was not statistically significant.

For demographic predictors with all other factors being held equal: (i) Hispanic participants' aggression score was 3.0% lower than White participants' aggression score ( $P < .001$ ); (ii) A female adolescent's aggression score was 1.5% higher than a male adolescent's aggression score ( $P < .001$ ); (iii) a student from a two-parent family had an aggression score that is 2.1% lower than that of students from another type of family ( $P < .001$ ).

For positive proximal processes with all other factors held equal: (i) Every one-unit increase in ethnic identity decreased the aggression score by 0.9% ( $P < .01$ ); (ii) every one-unit increase in religious orientation decreased the aggression score by 2.0% ( $P < .001$ ); (iii) every one-unit increase in school satisfaction decreased the aggression score by 5.2% ( $P < .001$ ).

For negative proximal processes with all other factors held equal: (i) Every one-unit increase in the school hassles scale increased the aggression score by 6.3% ( $P < .001$ ); (ii) every one-unit increase in the parent-adolescent conflict scale increased the aggression score by 1.3% ( $P < .001$ ); (iii) every one-unit increase in the friend rejection scale increased the aggression score by 2.3% ( $P < .001$ ); (iv) every one-unit increase in the peer pressure scale increased the aggression score by 1.8% ( $P < .01$ ); (v) every one-unit increase in the delinquent friend scale increased the aggression score by 12.4% ( $P < .001$ ); (vi) every one-unit increase in the internalizing symptoms scale increased the aggression score by 19.3% ( $P < .001$ ).

For neighborhood predictors with other factors held equal: (i) For every percentage point increase in percentage of residents aged 25 or older with no high-school diploma, aggression increased by 0.1% ( $P < .05$ ).

## DISCUSSION

The current study filled a significant gap in the research by examining the impact of multilevel risk and developmental assets on longitudinal trajectories of aggression in a culturally diverse sample of rural youth. The overarching thesis was that adolescents who participated in positive proximal processes across ecological levels benefit from the ensuing social capital and would display low levels of aggression, whereas youth who experienced negative proximal processes that erode social capital would disengage from their ecology and behave aggressively.

## Aggression Over Time: Developmental Trajectories

Based on existing research documenting that aggression decreased over time (Bongers et al., 2003; Miner & Clarke-Stewart, 2008; Williams et al., 2009), we predicted that over the 3-year study, we would witness a similar decrease. However, Hypothesis 1 was not supported and there was no significant change in aggression over time. This underscores the importance of conducting more developmental research in rural areas. Prior studies leading us to believe aggression decreases over time were primarily conducted in urban areas. It may be that rural adolescents maintained high levels of aggression in response to risk factors inherent in rural life (geographic isolation, lack of resources, depression, etc.). Although not in support of our hypothesis, this finding can be viewed in a somewhat positive light. The community in which the current study took place had high rates of crime, violence, and poverty, thus, it would have been possible for aggression to increase over time as youth were consistently exposed to high rates of crime and poverty. For example, in 2012, the rate of juvenile crime in the study community was 40.0 per 1,000 compared to 24.7 per 1,000 in the remainder of the state (Kids Count Data Center, 2014) and the unemployment rate was 12%, five percentage points higher than the national average (Bureau of Labor Statistics, 2012). These community risk factors could have served to increase rates of adolescent aggression. However, the stable levels of aggressive behavior suggests that, despite the multiple risk factors present in the current rural area, youth utilized the positive social relationships and assets present in their lives and avoided increasing their rates of aggressive behavior. More research is needed on rural trajectories.

## Demographic Variables

In contrast to Hypothesis 2 and previous literature on direct aggression, girls reported significantly higher levels of aggression than boys. The unique context in which this study took place might provide some explanation for this finding. Given the high rates of violence in the community, the likelihood that adolescents in the current study had experienced past victimization is higher than in other (e.g., nationally representative) samples of adolescents. The likelihood of past victimization might be particularly high among adolescent girls given that rates of sexual victimization as well as victimization within the home are higher among females as compared to males (Mollen, Fein, Localio, & Durbin, 2004; Scarpa, 2003). It is possible that unmeasured previous experiences of sexual victimization or abuse in the home contributed to more

aggressive behavior among female adolescents. Indeed, exposure to violent victimization has been associated with violent behavior among female adolescents (Molnar, Browne, Cerda, & Buka, 2005). It is necessary to note, however, that this finding must be interpreted with caution because the current study did not include a measure of relational or sexual aggression. Because physical aggression and relational aggression are moderately correlated (Card, Stucky, Sawalani, & Little, 2008), it is unclear if the gender effect would remain after controlling for relational aggression. This finding represents an important area for future research. Once again, researchers should pay attention to unique aspects of rural environments.

In the current study, adolescents who lived with two parents were significantly less likely to report aggressive behavior than youth living in another type of family situation. This finding was in line with our hypothesis and mirrors previous literature (e.g., Vaden-Kiernan et al., 1995). Hispanic adolescents were significantly less likely than White adolescents to report aggression. This is contrary to previous studies, which have documented significantly higher prevalence of aggression among Hispanic adolescents (Centers for Disease Control and Prevention, 2012). Family cohesion is of central importance in the Hispanic culture (Leidy, Guerra, & Toro, 2012). The term familism refers to close-knit attitudes, behavior, and family structures within an extended family system and is particularly salient for Hispanic families (Coohey, 2001). Familism was a protective factor that buffered against aggression (Smokowski & Bacallao, 2006). Perhaps, in the current study, familism, a construct that was not controlled in the analysis, accounted for the lowered rates of aggression in Hispanic youth. Furthermore, the North Carolina context for Hispanic adolescents may be more favorable for social capital development and consequently decreased aggression, compared to samples of Hispanic youth growing up in Los Angeles, Florida, New York, or Arizona.

### **Social Capital, Positive Proximal Processes, and Mental Health Functioning**

Our third hypothesis was that social capital, positive proximal processes, and mental health functioning in the form of ethnic identity, religious orientation, parent, friend, and teacher support, school satisfaction, and future optimism would be inversely associated with aggression. Hypothesis 3 was partially supported. Social capital in the form of ethnic identity, religious orientation, and the positive proximal processes that resulted in school satisfaction were significantly related to lower rates of aggression.

The current study supported past findings that ethnic identity was associated with lower rates of aggression

(Flanagan et al., 2011; Holmes & Lochman, 2008). This finding confirmed the protective nature of ethnic identity and mirrored past findings that ethnic identity was associated with successful mental health functioning (Phinney, 1990). Taken together, research suggests that ethnic identity protects against aggressive behavior both directly (as evidenced in the current study) and potentially indirectly by bolstering mental health functioning, which can protect against aggressive behavior. Further, high levels of ethnic identity indicate a feeling of connection to one's ethnic group. In the current study, a bond with an ethnically similar community might serve to foster a feeling of belonging and solidarity. According to social control theory, this feeling of belonging is a social bond that serves to constrain deviant behavior such as aggression (Hirschi, 1969). Thus, the social connections and bonds that both fostered and resulted from ethnic identity served to constrain youth from behaving aggressively.

Given the close connection between ethnic identity and religious orientation (Smokowski, Robertson, et al., 2013), it intuitively follows that religious orientation was also significantly associated with lower aggression. Rural churches are often racially homogenous (Dougherty, 2003), thus, religion and culture are inextricably tied and sermons often weave together themes of culture, social justice, and religion. The current findings supported past research affirming that attending church and valuing religion were associated with less aggressive behavior (Hollister-Wagner et al., 2001; Leach et al., 2008). Further, most religious groups commonly advocate for peace, camaraderie, and prosocial behavior and support doctrines that discourage violence and aggression. Youth with a high religious orientation likely followed these religious guidelines and, thus, refrained from aggressive behavior.

The hypothesis that school satisfaction would be significantly associated with decreased rates of aggression was supported. School satisfaction is indicative of social capital and positive proximal processes in the form of affirmative relationships with students and teachers. The current finding was in line with previous research on rural youth which found that high levels of school support were associated with higher self-esteem (Smokowski et al., in press). This finding indicated that when there was a good person–environment fit between adolescents and school, youth felt better about themselves and were less likely to display negative behavior such as aggression.

### **Erosion of Social Capital, Negative Proximal Processes, and Mental Health Problems**

The fourth hypothesis that negative ecological transactions assessed by parent–adolescent conflict, school

hassles, bullying victimization, friend rejection, peer pressure, delinquent peers, and internalizing symptoms would predict increased aggression was partially supported. All variables, with the exception of bullying victimization, were significantly associated with increased aggression. Of note, these variables contributed to larger increases in the aggression score than the decreases in the aggression score caused by the social capital factors and positive proximal processes. This finding illustrated the power that negative risk factors have on adolescent functioning.

The finding that parent–adolescent conflict was a significant predictor of aggression was in line with the family coercion theory of childhood aggression, which posits that negative family interactions increase youth problem behavior (Long, Edwards, & Bellando, 2009; Patterson, 1982). Engaging in conflict in the home normalizes this behavior, which consequently increases aggression and conflict outside of the home. Conflict between parents and adolescents erodes their attachment, which according to social control theory, can result in aggressive behavior (Hirshi, 1969). According to this theory, attachments and bonds to others (e.g., parents) serve to constrain deviant behavior, such as aggression. However, if these bonds become weakened by constant conflict, they are less likely to constrain aggression. The negative impact of parent–adolescent conflict appeared to be a stronger influence than the positive effects of parent support, which was not associated with lower aggression as hypothesized.

In the current study, school hassles, a significant predictor of aggression, were measured by a number of items that assess general physical and verbal mistreatment. The current study confirms past findings related to harassment and subsequent aggression (Camodeca & Goossens, 2005; Salmivalli & Nieminen, 2002). Given the lack of intervention on the part of both teachers and other students (Cunningham, 2007) during altercations, youth who are harassed may have responded aggressively out of frustration or as a means of self-protection. Current findings highlight the need for adult intervention so they can provide support in resolving conflicts before more aggression ensues. Given the close connection between school hassles and bullying victimization, it is somewhat surprising that bullying victimization was not a significant predictor of aggression. It is possible that youth were reluctant to identify their victimization experiences as bullying (Espelage & Holt, 2001). Further, victims of bullying may be chosen selectively based on low levels of aggression that make them easy targets, unlikely to retaliate. This shows that frequent harassment measured by schools hassles is likely to lead to aggressive revenge while bullying victimization (a

more intense assault) is more likely to lead to withdrawal and depression, not aggressive behavior.

In line with previous research (Dodge et al., 2003; Espelage et al., 2003; Ferguson et al., 2009), we found that negative peer relationships in the form of rejection, peer pressure, and delinquent friend behavior significantly predicted aggression. Friend rejection is a painful experience that can lead to anger and frustration that may manifest as aggression. Rejected youth often have deficits in social information processing and can interpret innocuous behavior as threatening and respond with aggression (Crick & Dodge, 1994). Past research suggested that rejection by peers exacerbated existing deficits in social information processing resulting in aggression (Dodge et al., 2003). Assessing social information processing was beyond the scope of the current study and is a task for future aggression research on rural youth.

In addition to friend rejection, it is possible that aggressive peers encouraged their classmates to behave aggressively through peer pressure. Given the importance of social status for adolescents, this pressure is difficult to ignore and youth might engage in aggression to appease their peers and avoid losing social status. Finally, in line with past findings, delinquent friends were a significant predictor of aggression and contributed to one of the highest increases in aggression scores (12.4%). This finding showed that youth who associated with delinquent peers are likely to have mimicked their delinquent behavior and act aggressively. The current research extended this past research highlighting the salience of peer influence in a rural context. It is noteworthy that the impact of negative peer relationships on aggression exceeded the protective nature of peer support. This finding highlights the need for adult intervention in negative peer interactions.

Providing support for the “acting out” model (Kofler et al., 2011), internalizing symptoms in the current study significantly predicted aggressive behavior and caused the greatest increase in aggression scores of all the variables (19.3%). According to this model, symptoms associated with internalizing problems, such as irritability, are related to aggressive behavior. The current findings highlighted the fact that a subset of youth suffered from both internalizing and aggressive behavior. These youth were at risk of experiencing negative proximal processes and decreased social capital, which perpetuated their problem behavior resulting in a negative feedback loop. Depressed youth may anticipate a bleak future and see no reason to refrain from acting aggressively. In order to interrupt this negative cycle, mental health supports are imperative.

Hypothesis 5 concerning school and neighborhood characteristics was only partially supported. No school

level variables were significantly associated with aggression and only the percentage of residents over age 25 with no high school diploma (a proxy for socioeconomic status) was significantly associated with aggression. This finding was in line with social disorganization theory, which posits that neighborhood structural characteristics, such as low SES, lead to delinquency through the inability of a community to identify common community problems and work cooperatively to solve them (Shaw & McKay, 1942). However, these neighborhood characteristics were not as influential as social relationships in adolescents' lives. Indeed, the effect for low neighborhood SES may indicate heightened accessibility to delinquent friends, peer pressure, inordinate family stress, and antisocial contagion that may occur in impoverished neighborhoods.

As predicted, school and neighborhood characteristics were not as salient in predicting aggression as were social capital constructs and proximal processes. By nature, aggression occurs in an interpersonal context. Thus, disrupted social relationships had a larger influence on aggressive behavior than distal contextual factors. This is particularly true for adolescents, given the salience of social relationships for this age group.

### LIMITATIONS

The study's findings must be understood within the context of specific limitations. First, although the scale we used to measure the dependent variable was empirically validated and commonly used in aggression research (Achenbach & Rescorla, 2001), it did not differentiate between proactive and reactive aggression or between direct and indirect (relational) aggression. This was problematic because it meant that the motivation behind the aggression was unclear (i.e., youth who defended themselves with aggression were indistinguishable from youth who initiated aggression). Future studies should also include a measure of relational as well as direct aggression. An additional limitation related to measurement is the fact that the SSP+ uses shortened versions of several scales. Although it would have been ideal to include additional scale items, this was not possible given the length of the SSP+ survey.

Second, researchers took every precaution to ensure that taking the survey was a confidential experience, however, it is possible that student's responses were influenced by the presence of peers. Ideally, participants should complete surveys in private; however, this was not feasible given the large size of the current sample and instead, adults closely supervised participants as they completed the online assessment. Third, the unique

racial/ethnic composition of the current sample is a strength of the study; however, caution is warranted in generalizing the results to other populations. In addition, shared method variance (i.e., the fact that the each construct was measured using surveys) was a limitation of the current study. Finally, a limitation of all longitudinal studies, including the current study, is attrition and missing data; however we employed the most stringent statistical missing data procedure, multiple imputation, to handle this limitation.

### CONCLUSIONS

The current study examined whether rural youth engaged in forming social capital through positive proximal processes across ecological levels would report low aggression, while youth who experienced negative proximal processes would display higher levels of aggression.

Negative social relationships had a stronger impact on later aggression than contextual factors. Specifically, parent-adolescent conflict, friend rejection, peer pressure, delinquent friends, and school hassles, significantly and positively predicted aggression. In addition, social capital in the form of ethnic identity, religious orientation, and school satisfaction buffered against aggression. Internalizing symptoms, gender, and family structure also significantly predicted aggression. These findings highlight the deleterious impact of negative proximal processes that not only serve to erode social capital, but also contribute to elevated levels of aggression. Therefore, the identification of risk factors for aggressive behavior can guide prevention and intervention programming. Given the minimal impact of school and neighborhood variables, programming efforts should focus on decreasing negative peer interactions and increasing positive parent-child attachments.

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