



A Person-Centered Exploration of Peer Aggression and Prosocial Behavior in Early Adolescence

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Abstract

Early adolescence is a critical time for promoting emerging adolescents' positive social skill development and mental well-being. This investigation addresses unique characteristics of these relations by holistically examining how school-based social cohesion and school stress combine to impact peer aggression and prosocial behavior. Using a person-centered approach, fifth and sixth grade students ($N = 142$, $M = 10.68$ years) were assessed on measures of social cohesion, school stress, peer aggression, and prosocial behavior at fall and spring time points. Latent cluster analyses revealed three student profiles: (1) low cohesion and high stress, (2) high cohesion and low stress, and (3) medium cohesion and medium stress. Significant differences in peer aggression and prosocial behavior were found between the three profiles and follow-up analyses examine profiles in association with other domain stress. Findings are discussed with respect to how schools may enhance services to promote prosocial behavior and mitigate aggressive trajectories.

Keywords Peer aggression · Prosocial behavior · School · Social relationships · Person-centered

Towards the end of elementary school, early adolescents in the USA become increasingly independent in the ways they navigate social relationships, spending more time outside of the home with peers (Eccles & Roeser, 2011; Farmer et al., 2015). Along with increased autonomy towards social relationships, key elements of social adjustment, including peer aggression and prosocial behavior, also become more frequent aspects of adolescents' lives (Pellegrini & Van Ryzin, 2011; Steinberg et al., 2006). Peer aggression and prosocial behavior hold significant consequences for youth depending on how they are expressed when interacting with others. Although substantial research has explored the function and consequences associated with peer aggression and prosocial behavior (Herts et al., 2012; Stefanek et al., 2017), very few studies have adopted a holistic perspective to studying early adolescent socialization (Berger et al., 2015; Ma et al.,

2020). In particular, understanding how stress and social cohesion are experienced in combination across individuals, and how that relates to the expression of peer aggression and prosocial behavior in early adolescents, has yet to be investigated. Such an investigation can help inform school-based programming, practices, and policy.

Examining the interplay of these social and emotional factors with a holistic perspective emphasizes the individual actor as the variable of analysis. That is, individuals are characterized by their report of relevant variables which come together to form an integrated profile unique to that person. Although the current research is concerned with aggressive and prosocial behaviors, these behaviors are understood as part of an individual's broader array of social functioning: specifically, school-based social cohesion and overall school stress. To understand one of these domains of student functioning, we treat the variable of interest within a cooperating set of social and behavioral factors, which contributes to more fully realizing the role of any single variable within an individual (Lerner et al., 2015). Thus, a holistic approach directs multiple variables to be considered together to represent the interactions of one's patterns of behavior. The current study also emphasizes the temporal nature of early adolescent social functioning (Ryoo et al., 2015) by examining the intersection of school-based social

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cohesion, overall school stress, peer aggression, and prosocial behavior at the beginning and end of the 5th and 6th grade academic year.

Peer aggression may involve overt displays of aggression towards one's peers (e.g., physical aggression, name calling), as well as covert behaviors (i.e., relational aggression), which involve indirect acts such as social exclusion, occurring either on-line or in-person (Lam et al., 2015; Rosen et al., 2017; Troop-Gordon, 2017). While a youth's role in peer aggression can vary (e.g., aggressor, victim, aggressor-victim, or bystander), the current investigation concerns the role of aggressors. Overt aggression peaks at the end of elementary school in the USA around age 11, only to be replaced by increasing relational aggression in middle school (Kraft & Mayeux, 2018). Peer aggression in both overt and covert forms is ultimately associated with a number of psychosocial consequences for victims and aggressors alike (e.g., depression, anxiety, conduct difficulties; Herts et al., 2012; Stefanek et al., 2017).

Early adolescence is also a time when youth prosocial behavior becomes more sophisticated and complex among broadening peer interactions (Laninga-Wijnen et al., 2018). Prosocial behavior involves voluntary acts intended to benefit others, such as expressions of empathy or helping behavior (Hastings et al., 2007). These positive ways of socially engaging take on increased importance during early adolescence as youth spend more time with peers. Engaging in prosocial behavior is a way to establish healthy relationships that make youth feel supported and connected with others. Research has shown the beneficial psychosocial outcomes associated with youth engagement in prosocial behavior, including increased sense of self-efficacy, empathy, civic engagement, and academic achievement (Choukas-Bradley et al., 2015; Larson & Tran, 2014). However, questions remain regarding the impact of proximal factors in the school environment that promote aggression or prosocial behavior toward peers (Padilla-Walker et al., 2015).

Contributors to Peer Aggression and Prosocial Behavior

Two factors that research has shown can impact these peer behaviors in youth are their sense of cohesion with peers and their school community, and experiences of stress specifically in the context of school. Past research has shown that students' sense of cohesion and their school stress impact how they relate to peers prosocially and aggressively (Herts et al., 2012; Renshaw & Jimerson, 2012; Springer et al., 2016; van den Bos et al., 2018). These constructs do not exist independently from each other as stress related to school is likely to impact the sense of cohesion youth feel within their community (Springer et al., 2016). Furthermore, how connected youth feel to others

is likely to influence their experience of and reaction to school stress (Kingsbury et al., 2020). As these variables are inter-related, they should be studied in a way that recognizes and accounts for their connection in the context of youths' broader experience. However, research has yet to explore how social cohesion and school stress operate alongside each other, and how this relates to interpersonal behavior. Studying the combined effects of school-based social cohesion and school stress on youth social behaviors calls for an analytical approach that extends beyond each factor's individual influence and accounts for how the interaction between these processes plays a role in influencing behavioral patterns within individuals (Clark et al., 2022; Von Eye & Bergman, 2003).

School-Based Social Cohesion

As a multidimensional construct, school-based social cohesion represents the presence of tight social networks within larger peer and school environments (Kawachi & Berkman, 2000). This stems from a large body of theoretical literature demonstrating the humans' basic need to feel a sense of connection and affiliation with others (Baumeister & Leary, 1995; Saint-Amand et al., 2017). A strong sense of social cohesion fosters a cooperative interdependence between peers through signs of support, trust, and sense of belonging (Bruhn, 2009). The current study involves a multi-dimensional examination as the peer group and school community represent two domains with enhanced significance during early adolescence. The bonds felt with one's close peers relate to a youth's social circle which serves as a reference group that influences the development of identity and sense of confidence (Espelage et al., 2015; Ragelienė, 2016). Social cohesion within the school community extends to the broader sense of care, support, and belonging felt in connection with teachers, staff, and administrators (Ellerbrock et al., 2014; Springer et al., 2016). The sense of cohesion felt within a peer group and school community helps shape the development of empathy, sense of self, and broader social-emotional adjustment (Thapa et al., 2013; Williford et al., 2016). Overall, the presence of strong, trusting bonds between peers and their primary social, academic, and family environments has been associated with decreases in peer aggressive behavior and the related psychosocial consequences (Springer et al., 2016; Wang & Dishoin, 2012). The term cohesion is used here to mean school-based social cohesion, which includes the peer group and school community.

Overall School Stress and Other Domain Stress: Social, Personal, Family

In addition to cohesion, overall school stress has been shown to impact youth functioning both globally and specifically related to peer aggression and prosocial behavior (Spruijt

et al., 2019; Wright, 2018). There exists a strong correlation between increased stress in school and disrupted emotional and behavior regulation, two skills that are highly implicated in social interactions (Erath et al., 2014; Goldstein et al., 2015; Sontag & Graber, 2010). Often, youth experiencing difficulty with emotion and behavior regulation due to heightened stress also demonstrate increased externalizing problems including peer aggression (Cooley & Fite, 2016; Herts et al., 2012). Middle schoolers' subjective experience of stress has also been correlated with greater academic difficulty and challenges such as friendship bonding (Goldstein et al., 2015). While strong peer relationships are often a protective factor for youth experiencing increased stress (McMahon et al., 2020), youth who are just starting to establish those peer connections may have greater difficulty developing close bonds if they are under increased stress. Taken together, these results provide support for the role of stress in influencing social processes and interpersonal behavior in youth, including peer aggressive and prosocial behaviors.

Though school stress is a primary concern, many studies have indicated the presence of increased emotion dysregulation and aggression in youth who report a wide range of stress-related experiences across multiple contexts (Garafalo & Velotti, 2017; Herts et al., 2012). This research has examined mechanisms linking stressful life events and aggressive behavior from a framework of social information processing (Cooley & Fite, 2016; Garafalo & Velotti, 2017). That stress originating in one setting (e.g., family) can affect youth's functioning in other settings (e.g., school) underscores the importance of measuring stress across multiple domains to comprehend more fully the impact of stress across youth functioning. As stress outside of school is likely to relate to stress in school and impact youth behavior, the current study also examines descriptively stress in other domains.

By studying how cohesion and stress operate together, and how that combination relates to key social behaviors of peer aggression and prosocial behavior in youth, the current study extends prior work that has studied these constructs independently and offers insights about the unique experiences of early adolescents.

The Present Study

Investigations that rely on variable-centered approaches and cross-sectional methodologies (e.g., Ryoo et al., 2015) assume homogeneity in the way youth relate to these social and emotional variables rather than considering the heterogeneity in student experiences. Investigations using these between-subjects designs suggest an inverse relationship between youth cohesion and stress (Sontag & Graber, 2010; Springer et al., 2016).

Cross-sectional methods struggle to capture the fluidity of youth social and emotional processes, which has contributed to difficulty in determining the stability of peer aggression and prosocial behavior over time (Erath et al., 2014; Goldstein et al., 2015). By using a combination of person and variable-centered approaches, the current study aims to examine how cohesion and stress operate together within youth at the beginning and end of the academic year, to discern similarities and differences in students' experience of cohesion, stress, and social behaviors across time. Based on previous research, we expect there to be some meaningful relationship between cohesion and stress as they relate to peer aggression and prosocial behavior, though we do not have specific predictions about the way these constructs relate to each other over time within individuals given the exploratory and person-centered nature of the investigation. To better understand the heterogeneity in students' cohesion-stress profiles, person-centered analyses first examine whether latent clusters of students form naturally based on student-reported levels of cohesion and stress across fall and spring time points. There were no a priori assumptions about the number of clusters that would emerge. To then see how students' cohesion-stress profiles relate to their social behaviors, variable-centered analyses examine the association between data-driven latent clusters and social adjustment outcomes of peer aggression and prosocial behavior across the two time points. Examining these constructs through person and variable-centered analyses supports the ability to differentiate youth peer aggression and prosocial behavior while accounting for how social cohesion and stress function within these individuals. These variables are finally explored in relation to youth experiences in other domains, allowing for initial consideration of how stress in contexts external to school may be contributing to student's functioning and behavior in school.

Method

Participants

Data were collected approximately 7 months apart in the fall and spring from 142 5th and 6th grade public elementary or middle school students, aged 9–12 years, across two school districts in the Northeast region of the USA. Districts were similar across demographic characteristics and comparable in percentage of students receiving free or reduced lunch and student-to-staff ratios (5.3–5.5 students/staff, 13–14% free/reduced lunch). Informed consent and assent were obtained for families and students, respectively, and data collection took place at the

Table 1 Sociodemographic characteristics of participants at time 1

Characteristic	<i>n</i>	%
Gender		
Male	68	47.9%
Female	74	52.1%
Age		
9	4	2.8%
10	47	33.1%
11	80	56.3%
12	11	7.7%
Grade		
5	55	38.7%
6	86	60.6%
Missing	1	0.7%
District		
MA	81	43.0%
NY	61	57.0%
Ethnicity		
White	103	72.5%
African American	5	3.5%
Latino/Hispanic	7	4.9%
Asian	14	9.9%
Biracial	9	6.3%
Other race/ethnicity	2	1.4%
Missing	2	1.4%

N = 142. Participants were on average 10.68 years old

schools during free periods for both time points. See Table 1 for complete sample sociodemographic information.

Measures

Cohesion

The adapted Social Cohesion and Trust Scale was used to assess participants' level of school-based social cohesion within their peer group and their school community (SC&T; Drukker et al., 2009). The adapted version added six items to better assess neighborhood bonds and trust (Drukker et al., 2009). The original version is strongly correlated ($r=0.80$) with measures asking about willingness to intervene in dangerous behaviors within a neighborhood (e.g., breaking up a fight; Sampson et al., 1997). The revised version of the scale was adapted to measure perceptions of school-based social cohesion on two levels, peer group and community, and items were rated on a 5-point Likert scale ranging in agreement from 1 (strongly disagree) to 5 (strongly agree). Items were modified to reflect the school community and two items that could not be adapted were deleted. The scale involved a total of 18 items, half assessing students' social cohesion within their school community (e.g., "Kids in this school are willing to help their classmates") and half

asking about social cohesion within their school peer groups (e.g., "I feel safe at school" modified to "I feel safe when I am with my group of friends"). In the current participant sample, subscales demonstrated acceptable internal consistency (peer group, $\alpha_{\text{fall}}=0.78$, $\alpha_{\text{spring}}=0.70$; school community, $\alpha_{\text{fall}}=0.78$, $\alpha_{\text{spring}}=0.71$). School community and peer group subscales did not demonstrate multicollinearity ($r=0.49$; Pallant, 2010) in the current sample, and were treated as different levels of the cohesion construct in analysis.

Stress

Stress was measured with the 10-item, adapted version of the Perceived Stress Scale-10 (PSS-10), assessing individuals' perception of their school-specific stress in the past month (Cohen et al., 1983). Administered in the school context, the PSS includes five general stress items (e.g., *angry about things outside of your control*) and five specific to school (e.g., *confident about your ability to handle problems at school*), which were rated on a 5-point Likert scale ranging from 1 (never) to 5 (very often). Framing provided by administration in a school setting and school-specific items indicate the assessment of school-related stress. The scale demonstrated good internal consistency across the participant sample ($\alpha_{\text{fall}}=0.85$, $\alpha_{\text{spring}}=0.86$) and strong test–retest reliability across 2-week intervals ($r=0.77$; Burns et al., 2011). Adequate correlation with depression symptomatology has also been shown (Pearson's $r=0.65$ – 0.76 ; Burns et al., 2011).

Other-Domain Stress

First developed to assess a range of life events commonly reported by children and adolescents, the Adolescent Perceived Events Scale (APES) assessed domain-specific stress in the past 6 months (Compas et al., 1987). The original scale, which includes stressful and positive events, was modified to include 23 items assessing stressful events across four domains in which stress may be prevalent for early adolescents, including social (4 items), family (12 items), school (4 items), and personal (3 items). The original scale's inclusion of a desirability rating was also removed due to the focus on stressful events and to lower participant burden. The instrument assessed whether students experienced a stressful life event and did not assess severity of the event. The scale demonstrated acceptable internal consistency ($\alpha_{\text{fall}}=0.67$, $\alpha_{\text{spring}}=0.74$), and has shown good retest reliability over a 2-week time period ($r=0.74$ – 0.89 ; Compas et al., 1987).

Peer Aggression and Prosocial Behavior

Peer aggression and prosocial behavior were measured using the 18-item, "Bully version" of the Revised Peer Experiences Questionnaire (RPEQ) (Prinstein et al., 2001). Scale

items are behaviorally specific to assess a variety of aggressive behaviors directed towards peers but not specific to bullying (e.g., “I left another kid out of an activity or conversation”), on a 5-point Likert scale ranging from 1, never, to 5, a few times per week. Originally composed of three subscales including overt aggression (4 items), relational aggression (9 items), and prosocial behavior (5 items, e.g., “I stuck up for a kid who was being picked on/excluded”), five items assessing electronic aggression were also added to the instrument. This type of aggression was added to assess in response to the increase in electronic forms of aggression among youth online and items were informed by electronic aggression literature (e.g., “I did not include another kid on a group text or email on purpose”) (Horner et al., 2015; Shah et al., 2019). Factor analysis on the aggression-related subscales (overt, relational, electronic) showed strong loading onto the first component for all variables (eigenvalue = 5.59), which supported combining the subscales to create a combined total aggression score.

The RPEQ demonstrates good test–retest reliability over a 6-month period (Pearson’s $r = 0.48–0.52$) and internal consistency of the current sample was similar to previous findings ($\alpha = 0.61–0.81$; De Los Reyes & Prinstein, 2004). The total aggression scale ($\alpha_{\text{fall}} = 0.72$, $\alpha_{\text{spring}} = 0.82$) and prosocial behavior subscale ($\alpha_{\text{fall}} = 0.81$, $\alpha_{\text{spring}} = 0.84$) also demonstrated good internal consistency across fall and spring administrations. As peer aggression and prosocial behavior subscales were minimally correlated ($r = -0.30$), the prosocial behavior subscale was treated independently from the total peer aggression score, which prior literature supports (Glass & Fireman, 2016).

Data Analysis Procedure

Person-centered and variable-centered approaches are used to statistically address the questions of interest. Person-centered analyses are concerned with the function of characteristics within individuals and the way similar levels of predictors influence outcomes differently across people, while variable-centered statistics reveal differences across groups of people, assuming the function of predictors on outcomes is similar across individuals (Von Eye & Wiedemann, 2015). All analyses are conducted using IBM SPSS Statistics, Version 26 (IBM Corp, 2019).

A TwoStep cluster analysis first determined whether latent clusters of participants emerged based on reported cohesion and stress. TwoStep cluster analysis utilizes a hybrid approach including a distance-based measure to separate individuals, followed by a probability-based approach to find the optimal cluster solution (Gelbard et al., 2007; Kent et al., 2014). The current sample size has been identified in the literature as appropriate for the TwoStep auto-cluster procedure based on the number of clustering variables and their importance in

determining the cluster solution (Dolnicar et al., 2013; Von Eye & Bergman, 2003). TwoStep cluster analysis also offers advantages over traditional cluster techniques by allowing clusters to be identified accurately without pre-determining the number of clusters to emerge. This is made possible by using Schwarz’s Bayesian Information Criterion (BIC), which incorporates distance measures and criterion statistics to determine the optimal number of clusters according to specific criteria (Theodoridis & Koutroumbas, 1999). Algorithm-generated pre-clusters are created based on commonalities among variables (Theodoridis & Koutroumbas, 1999). Pre-clusters are then tested using an agglomerative hierarchical clustering algorithm to produce a range of possible solutions, the most optimal of which has the lowest BIC coefficient (Theodoridis & Koutroumbas, 1999). A unique cluster is also created to mitigate descriptive bias among clusters if outliers are present. Latent clusters established at fall and spring time points were then analyzed to examine the stability and change in cluster membership from beginning to end of the year. Chi-square tests of independence assessed the non-independence of data at fall and spring time points.

Between-group analysis of variance (ANOVA) were then conducted to examine the association between latent cluster student profiles and outcomes of peer aggression and prosocial behavior at both time points. Finally, parametric and non-parametric methods were used to descriptively explore correlations between latent cluster membership stability and patterns of social and behavioral variables.

Results

Data were first examined to verify normality and suitability to be included in analyses. Participants missing more than 5% of data were excluded from analyses ($n = 2$). All continuous variables were mean centered to allow for meaningful comparisons. Means and standard deviations of all variables were initially examined according to grade and school district. To ensure that there were no significant differences in students between grade level and school district, one-way between-group analyses of variance were conducted and no significant differences emerged between groups across any variables.

TwoStep Cluster Analyses

A TwoStep cluster analysis was conducted at the fall time point with student-reported cohesion and stress entered as predictors in the model, from which an optimal three-cluster solution emerged (BIC = 254.76). The cluster solution accounted for 99.3% of the sample and stress emerged as the predictor with the greatest importance (1.0). After reviewing the general cluster solution, each cluster was evaluated

Table 2 Fall TwoStep cluster distribution variable centroids

Criterion variable	Cluster solution						Total sample	
	Low SBSC-High OSS		High SBSC-Low OSS		Medium SBSC-Medium OSS			
	<i>n</i> = 42		<i>n</i> = 48		<i>n</i> = 51		<i>N</i> = 141 ^a	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Peer group social cohesion	-3.32	4.5	4.18	2.04	-1.34	1.98	37.26	4.34
School social cohesion	-3.47	4.07	3.71	2.66	-0.62	2.97	32.87	4.34
Overall school stress	7.53	5.52	-3.68	4.6	-2.62	3.45	22.67	6.66

SBSC, school-based social cohesion; OSS, overall school stress

^a1 case excluded

individually to best characterize the students that made up that subgroup of individuals. Cluster 1 emerged as the smallest of the three clusters and was labeled “Low Cohesion-High Stress,” as students in this cluster endorsed the lowest levels of cohesion and the highest reported stress when compared to other student clusters. Consistent with the most important predictor for the cluster solution, stress was the most important predictor in the “Low Cohesion-High Stress” cluster (1.00). The second cluster was labeled “High Cohesion-Low Stress” as students defining this cluster reported the highest rates of cohesion upon comparison and the lowest stress levels. The most important predictor in this cluster was cohesion, specifically within the peer group (0.97). The final cluster, labeled “Medium Cohesion-Medium Stress,” was the largest of the three and participants defining this cluster reported levels of cohesion and stress that were between the previous two clusters on average. Consistent again with the cluster solution, stress emerged as the most important predictor (1.00). See Table 2 for cluster solution descriptive information in the fall.

A second TwoStep cluster analysis was conducted at the spring time point with spring endorsements of cohesion and stress, which again revealed a similar three-cluster solution accounting for 98.6% of the sample (BIC = 255.07). As in the fall, the predictor with the highest importance was stress (1.00). The first cluster (Low Cohesion-High Stress) which was the smallest in size of the three, consisted of students with the lowest cohesion and highest stress. The most important variable was stress (1.00). The second cluster (“High Cohesion-Low Stress”) included students with the highest cohesion and lowest stress. The predictor with the most importance was cohesion towards the peer group (0.70). The final and largest cluster in the spring consisted of students who reported levels of cohesion and stress that were between the first two clusters. The variable with the greatest importance was cohesion towards the peer group (0.70). The difference between variable centroids in the “Medium Cohesion-Medium Stress” compared to the “Low Cohesion-High Stress” and “High Cohesion-Low Stress” clusters increased

from fall to spring time points, indicating increased polarization in levels of cohesion and stress in “Low Cohesion-High Stress” and “High Cohesion-Low Stress” clusters. See Table 3 for cluster profiles at the spring time point.

The structural profile of the cluster solutions was maintained from fall to spring, although the variable centroids of each cluster became descriptively more extreme in the spring, with low cohesion becoming lower and high stress levels growing higher. In this way, the students who occupied the “Low Cohesion-High Stress” and “High Cohesion-Low Stress” clusters in the spring did so by endorsing levels of cohesion and stress that led to the clusters’ descriptive profiles being more extraordinary than they were in the fall. With “Low Cohesion-High Stress” and “High Cohesion-Low Stress” clusters moving further away from each other, membership in these groups decreased and the clusters shrunk in size. In contrast, the “Medium Cohesion-Medium Stress” cluster expanded in the spring as it was populated by more students with levels of cohesion and stress closest to the “Medium Cohesion-Medium Stress” variable centroids. Independent-samples *t*-tests were conducted to determine whether clusters differed across grade, school district, and gender characteristics. No significant differences were found.

Chi-Squared Test of Independence

A Chi-square test of independence was conducted to examine changes in group membership from fall cluster to spring clusters. Findings revealed change in cluster membership from fall to spring, though it was not significant (McNemar-Bowker Test value¹ = 31.24, *df* = 5, *p* < 0.001). Across the sample, 80 students (56.4%) remained stable in their cluster membership from fall to spring and the “Medium Cohesion-Medium Stress” cluster demonstrated the greatest stability in membership (*n* = 43, 30.3%), followed by the

¹ A significant McNemar-Bowker Test indicates non-significant change in variables of interest.

Table 3 Spring TwoStep cluster distribution variable centroids

Criterion variable	Cluster solution						Total sample	
	Low SBSC-High OSS		High SBSC-Low OSS		Medium SBSC-Medium OSS			
	<i>n</i> = 20		<i>n</i> = 31		<i>n</i> = 89		<i>N</i> = 140 ^a	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Peer group social cohesion	-3.31	5.36	5.39	1.46	-1.16	3.19	37.02	4.41
School social cohesion	-7.30	4.77	5.39	4.33	-0.24	3.20	32.35	5.28
Overall school stress	11.69	6.11	-6.61	4.45	-0.15	4.44	23.31	7.17

SBSC, school-based social cohesion; OSS, overall school stress

^a2 cases excluded

“High Cohesion-Low Stress” cluster ($n=23$, 16.2%), and finally the “Low Cohesion-High Stress” cluster ($n=14$, 9.9%). Movement between clusters was seen in 59 students (41.5% of total sample), most of whom shifted to the “Medium Cohesion-Medium Stress” cluster from the “Low Cohesion-High Stress” cluster ($n=26$, 18.3%) and “High Cohesion-Low Stress” cluster ($n=20$, 14.1%).

The movement between clusters across the school year must be considered in relation to the observed shift in criterion variables discussed previously. Although cluster solutions were similar in degree and directionality from fall to spring, they are distinct as the clusters that emerged in the fall were not structurally or descriptively equivalent to those that emerged in the spring. Thus, a student’s movement between clusters is also in the context of simultaneous movement in the cluster profiles, as they are defined by student responses. The nature of change in cluster membership depicted both the “High Cohesion-Low Stress” and “Low Cohesion-High Stress” clusters growing more distinguished over time. As a result, students who may have been in the margins of these clusters in the fall were closer to the “Medium Cohesion-Medium Stress” cluster in the spring. However, this movement is not representative of students regressing towards the mean, as the level of cohesion and stress reported by each student was maintained within their cluster membership rather than being replaced with a single cluster average. Also, the fall cluster solution was not treated as a baseline model from which the spring cluster solution was derived.

One-Way Analysis of Variance

Fall and spring cluster solutions were then analyzed in association with peer aggression and prosocial behavior outcome variables. A one-way analysis of variance (ANOVA) was conducted with cluster group membership predicting self-reported peer aggression and prosocial behavior at the fall time point. The assumption of homogeneity of variances was assessed and satisfied based on Levene’s statistic, $F(2,$

138) = 3.04, $p=0.05$. There were significant differences in peer aggression across clusters, $F(2, 140) = 6.96$, $p < 0.01$, eta squared = 0.092. Least significant difference (LSD) post hoc analyses revealed that students in the “Low Cohesion-High Stress” cluster engaged in significantly more peer aggressive behavior than “High Cohesion-Low Stress” cluster students and “Medium Cohesion-Medium Stress” cluster students. Significant differences were also found in prosocial behavior, $F(2, 137) = 7.82$, $p < 0.01$, eta squared = 0.103, with students in the “High Cohesion-Low Stress” cluster demonstrating significantly more prosocial behavior than students in both the “Low Cohesion-High Stress” and “Medium Cohesion-Medium Stress” clusters.

A one-way ANOVA was conducted with cluster group membership entered as a predictor of self-reported peer aggression and prosocial behavior at the spring time point. Assumptions of homogeneity of variances were violated in peer aggression analyses, Levene’s statistic $F(3, 137) = 14.42$, $p < 0.001$, and degrees of freedom were adjusted accordingly, Brown-Forsythe statistic $F(3, 24.76) = 7.73$, $p = 0.001$, eta squared = 0.177. Post hoc findings revealed that students in the “Low Cohesion-High Stress” cluster continued to demonstrate significantly higher levels of peer aggression than peers in the “High Cohesion-Low Stress” and “Medium Cohesion-Medium Stress” clusters. Interestingly, significant differences in prosocial behavior were found between the “High Cohesion-Low Stress” cluster and the “Medium Cohesion-Medium Stress” cluster only, $F(3, 140) = 3.74$, $p < 0.05$, eta squared = 0.076. Thus, students in the “Medium Cohesion-Medium Stress” cluster reported the lowest prosocial behavior in the spring out of the three clusters. See Table 4 and Table 5 for complete results of statistical analyses.

Cluster Profiles and Cluster Membership

To further explore the characteristics within each cluster, we examined the stability in students’ cluster membership from fall to spring time points. Of the total participant

Table 4 Means and standard deviations of reported peer aggression and prosocial behavior by cluster and timepoint

Cluster	Fall				Spring			
	Peer aggression		Prosocial behavior		Peer aggression		Prosocial behavior	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Low SBSC-High OSS	24.29	4.36	15.20	3.79	27.31	7.79	15.85	4.36
High SBSC-Low OSS	21.63	3.14	17.51	3.67	20.81	2.74	17.65	3.95
Medium SBSC-Medium OSS	21.85	3.64	14.54	4.13	22.42	3.61	15.48	3.92

Table 5 Mean difference in peer aggression and prosocial behavior across clusters

Peer aggression		Cluster (J)	Fall	Spring
Cluster (I)	Mean difference (I – J)			
Low SBSC-High OSS	High SBSC-Low OSS		2.66**	6.50***
	Medium SBSC-Medium OSS		2.44**	4.89***
High SBSC-Low OSS	Low SBSC-High OSS		2.66**	6.50***
	Medium SBSC-Medium OSS		0.22	1.61
Medium SBSC-Medium OSS	Low SBSC-High OSS		2.44**	4.89***
	High SBSC-Low OSS		0.22	1.61
Prosocial behavior		Cluster (J)	Fall	Spring
Cluster (I)	Mean difference (I – J)			
Low SBSC-High OSS	High SBSC-Low OSS		2.31	1.80
	Medium SBSC-Medium OSS		2.31**	0.37
High SBSC-Low OSS	Low SBSC-High OSS		2.31	1.80
	Medium SBSC-Medium OSS		2.97***	2.17*
Medium SBSC-Medium OSS	Low SBSC-High OSS		2.31**	0.37
	High SBSC-Low OSS		2.97***	2.17*

* $p < .05$; ** $p < .01$; *** $p < .001$

sample, 56.4% of students ($n = 80$) remained stable in their membership to one of the three clusters. The “Low Cohesion-High Stress” and “High Cohesion-Low Stress” clusters grew more distinct in average cohesion and stress in the spring, so students who remained stable in the “Low Cohesion-High Stress” or “High Cohesion-Low Stress” cluster did so by endorsing consistently higher or lower levels of cohesion and/or stress.

Students who remained stable in their membership to the “Low Cohesion-High Stress” and “High Cohesion-Low Stress” cluster displayed patterns of peer aggression and prosocial behavior that were similar to those seen in the overall cluster solution with all participants. Thus, students who remained stable in the “Low Cohesion-High Stress” cluster reported significantly higher peer aggression from fall to spring, $t(13) = -2.50$, $p < 0.05$, while students stable in the “High Cohesion-Low Stress” cluster reported marginally less peer aggressive behavior over the year. These stable students in the “High Cohesion-Low Stress” cluster also endorsed the highest levels of prosocial behavior in the fall, which further increased in the spring.

Other-Domain Stress

Patterns in student-reported domains of stress, including family, personal, and social areas, were examined. Stress events endorsed most frequently were in the family domain across all students. Across clusters in the fall, students in the “Low Cohesion-High Stress” cluster endorsed more domain-specific stress events in the past 6 months compared to peers. Students in the “Low Cohesion-High Stress” and “Medium Cohesion-Medium Stress” cluster reported a similar presence of family stress events, 97.6% and 96.1%, respectively, while 83.3% of students in the “High Cohesion-Low Stress” cluster reported the presence of family stress events. While this is the lowest rate of the three clusters, all clusters had relatively high numbers of students who reported family stress events. In social and personal domains, however, the “Low Cohesion-High Stress” cluster appeared distinct from other clusters in the proportion of students who reported the presence of stressors in these domains. In the domain of social stress, 71.4% of students in the “Low Cohesion-High

Stress” cluster reported the presence of social stressors compared to 41.67% of “High Cohesion-Low Stress” cluster students and 51% of “Medium Cohesion-Medium Stress” cluster students. In the personal domain, 71.43% of students in the “Low Cohesion-High Stress” cluster reported at least one personal stress event, compared to 54.17% of students in the “High Cohesion-Low Stress” cluster and 45.10% of students in the “Medium Cohesion-Medium Stress” cluster. Thus, while there were distinct differences in severity and frequency of domain-specific stress across students, they aligned in the type of stressful event reported most frequently. Domain-specific stress events reported in the spring reflected similar patterns across family, personal, and social areas.

Discussion

Cohesion and stress independently have been demonstrated to influence socialization (Gini et al., 2018; Herts et al., 2012). The present holistic study extends this work by examining how stress and cohesion combine across individuals and both operate over time in relation to youth peer aggression and prosocial behavior. Through person-centered analyses which focused on groups of students with similar stress and cohesion patterns, we identified distinct stress-cohesion profiles of students that were meaningfully related to peer aggression and prosocial behavior. With no prespecification for the number of clusters, results yielded three distinct clusters of students having different patterns of stress and cohesion. The same three clusters were found at two time points across the academic year, in the fall and again in the spring. While individual membership within clusters was moderately stable over the year, there was a notable shift of students between adjacent clusters from fall to spring. Even with this movement, the clusters remained coherent and meaningful with the relation between cohesion and stress becoming more distinct from the fall to the spring. Specifically, the cluster with initially low cohesion and high stress in the fall displayed even lower cohesion and higher stress in the spring. Similarly, the cluster with the highest cohesion and lowest stress in the fall was characterized by even higher levels of cohesion and lower stress in the spring. Thus, results revealed the existence of three groups whose members share similar properties. The classification of these groups provides insight in describing student characteristics with stress and cohesion and is useful in beginning to understand the implication of this relation.

The finding of an inverse relation between cohesion and stress is consistent with prior research (Davidson & McEwen, 2012; Sontag & Graber, 2010); however, the fact that the groups became more extreme from fall to spring may have longer term implications for these clusters of students. In particular, there

is concern about students who make up the high stress and low cohesion group at the end of the school year. Understanding the propensity for students to be in the low cohesion and high stress group in the spring may have increased urgency given that this group’s experience becomes more extreme. Of course, understanding the propensity for students to be in the high cohesion and low stress group in the spring is also of importance for gaining insight into healthy socialization.

Consistent with prior research (Espelage et al., 2015; Gini et al., 2018), students with high stress and low cohesion demonstrated higher peer aggression than students within the other two clusters. Also in line with existing literature, students with low stress and high cohesion engaged in the most prosocial behavior and the least peer aggression (Herts et al., 2012). Interestingly, although students with medium levels of stress and cohesion reported peer aggression that fell between the lowest and highest levels, they reported the lowest level of prosocial behavior. This finding that the medium cluster reported lower levels of prosocial behavior than those students struggling with high stress and low cohesion raises questions about the functional utility of prosocial acts in relation to peer status, social norms, and social development. For example, this may reflect socialization strategies of conformity and affiliation which are heightened during early adolescence (Choukas-Bradley et al., 2015). At an age when peer influence and the impact of the imaginary audience are particularly high (Chierchia et al., 2020), students in the “Medium Cohesion-Medium Stress” cluster may avoid the risk of overt prosocial behavior and act as passive bystanders in an effort to blend into the group. Thus, students in the medium cluster, the largest cluster in terms of population size, may be more focused on diminishing the social cost associated with standing out to peers. Future research would benefit from gaining a better understanding of the link between being in the medium cluster and reporting the lowest levels of prosocial behavior. Furthermore, recognizing that this middle group of students exists, and that it constitutes a majority of the sample, is valuable to consider when implementing school programming to support building prosocial behaviors, enhancing sense of community, and increasing bystander intervention behavior (Wójcik & Hełka, 2019).

Stress in personal, social, and family contexts was another element of students’ experiences explored and family-related stressors were reported the most across students. This may reflect the significance of family at this age, as early adolescents are likely to have the most familiarity and experience with their family compared to areas. The growing importance of youths’ social lives and increased emphasis on peer relations may also be impacting the high levels of family stress. With their network of peer relationships expanding, youth relationships with family often also experience a shift that can be associated

with increased stressors. Youth who remained in the “Low Cohesion-High Stress” cluster throughout the year experienced significantly more family stress events than other students, revealing a link between heightened levels of school stress and the presence of family stressors. Youths’ proximity to essential family-based activities and the inability to distance themselves from the home may increase the disruptiveness of family stressors in other contexts (Goldstein et al., 2015; King et al., 2019). A bidirectional relationship is also plausible, wherein stressors in other contexts impact early adolescents’ functioning at home and contributing to stress within the family.

Study Limitations

While this investigation cannot speak to the directionality or causality of the relationships between constructs of interest, results illustrate how the stress and cohesion clusters meaningfully relate to social behaviors in early adolescents. Future studies will be needed to replicate these person-centered findings in new and more diverse samples of early adolescents. Findings indicated that the largest cluster of students reported the lowest levels of prosocial behavior. This result must be further researched, and particular attention must be paid to understand what low levels of prosocial behavior look like in terms of students’ behavior, and what other factors might be impacting the unexpected low rate of prosocial behavior in the “Medium Cohesion-Medium Stress” cluster compared to other clusters. The current study assessed prosocial behavior in the form of general support within a peer context, though prosocial behavior is broad and can involve other elements not assessed here (e.g., empathy, altruism). Current results cannot speak to aspects of prosocial behavior not assessed, and future research may consider more broad assessments of prosocial behavior to determine how other elements of prosocial behavior operate in relation to peer aggression, social cohesion, and stress. Results also depicted increased levels of peer aggression in the “Low Cohesion-High Stress” cluster, which is tentative and must be investigated further to determine whether early adolescent aggression truly increases throughout the year. Multi-informant reports of student behavior would also provide added sources of information to corroborate self-report behavior and enhance the validity of data. Finally, tracking the clusters in relation to social outcomes across more time points during the year would potentially yield greater insight into directionality of these factors.

Conclusion

By increasing awareness of the amount of change and stability in stress-cohesion profiles over time in relation to social behavior, this study provides insight into the nature of the

relationship of social functioning to peer aggression and prosocial behavior. The relationship between cohesion and stress differed within individuals in a non-linear way. While there was some coherence in how cohesion and stress both operated within students, they operated differently across individuals over time and in a way that was meaningful to social functioning. Findings revealed three distinct classifications of students according to characteristics of stress and cohesion and the clusters remained consistent from fall to spring. Within the clusters, the majority of students remained stable, but a large minority moved from one to another raising important questions about the mechanisms of stability and change for individuals within and between clusters. In relation to peer aggression and prosocial behavior, two of the clusters showed significant associations with these behaviors that were consistent with past research (Saint-Amand et al., 2017; Wang & Dishoin, 2012). With the emergence of the third cluster with medium levels of cohesion and stress, the novel finding of lower prosocial behavior highlights the complex relations between these variables. In particular, the elements of social relations and orientation towards the common good within cohesion may have more variability in the medium level versus the two extremes. This variability could impact an individual’s willingness to engage in prosocial behavior. Understanding this stress-cohesion profile where youths’ report a lack of positive social engagement is of value when developing programming to promote prosocial behavior in the school community.

Data Availability The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declarations

Conflict of Interest The authors declare no competing interests.

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