

Investigating Patterns of Association Between Adolescent Loneliness and Adolescent Developmental Domains

Archer Ward¹, Anne Abbott, PhD, MPP¹ , Jason Shanks², Taylor Neher, DrPH, MPH¹ , Megan Lorraine Smith, PhD¹ 

¹ School of Public and Population Health, Boise State University, ² School of Education, University of Idaho

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Background

Adolescent mental health is on the decline, and questions have been raised as to what might be contributing. The experience of emotional and social loneliness has been linked to an increased risk of developing anxiety, depression, and suicidal behaviors in both adulthood and adolescence. However, little research has been conducted on the relationship between known risk and protective factors and loneliness in adolescence.

Methods

This secondary data analysis aims to examine the patterns of association between risk and protective factors in key developmental domains on loneliness. A total of 7,737 adolescent (M age = 14.6, 51% male) responses were collected during the 2022-2023 academic year. Multiple regression was used to test the patterns of association. A one-way ANOVA was deployed to examine mean differences between junior high and high school students.

Results

Results found that indicators from the family, peer and school domain, as well as the individual level self-awareness indicator, were significantly negatively associated with loneliness. Junior High School Students reported significantly higher family support, peer support, school connectedness and self-awareness.

Discussion

Findings suggest that interventions for adolescent loneliness should consider targeting risk and protective factors across all key developmental domains.

Conclusion

While additional research is needed to more fully understand loneliness among today's adolescents, this study provides a necessary first step and paves the way for the creation of additional interventions in this area.

Introduction: In 2023, the Office of the United States Surgeon General released an advisory that Americans across the lifespan are experiencing an epidemic of loneliness and social isolation.¹ Loneliness, which the Surgeon General's Advisory defined as a subjective distressing experience that results from perceived isolation or inadequate meaningful connections, has been shown across multiple studies as a determinant of both physical and mental health outcomes.¹⁻⁵ While loneliness and social isolation are concerning for individuals across the lifespan, loneliness during the adolescent period of development (roughly ages 10-17)⁶ is especially worrisome given that a) adolescent loneliness has been shown across many studies to be a determinant of youth mental health challenges like symptoms of anxiety and depression as well as suicidal behaviors,²

⁷ and that b) adolescents are currently experiencing historically high rates of these mental health challenges.⁸⁻¹¹ There is also evidence that experiencing loneliness in childhood or adolescence can lead to poor mental and physical health outcomes in adulthood,^{4,12-15} which is perhaps not surprising given that adolescence is a crucial developmental period that can set a foundation for the life course.¹⁶ Increased understanding of both loneliness and the relevant risk and protective factors is needed.

ADOLESCENCE AND THE SOCIAL ENVIRONMENT

Profound change occurs during adolescence as it marks the transition from immaturity to maturity.¹⁶ Throughout this second decade, the biological processes of adolescence can

be looked at more universally as all young people will experience puberty. However, the social environment surrounding a person going through puberty can be dramatically different from someone else. A young person's family, school, and peers uniquely influence the developmental experiences of that individual.^{6,17-19} These "developmental domains" can have profound impact on a person's behavior, social habits, and health.^{18,20,21} Evidence suggests these impacts occur via the risk and protective factors contained within each domain.¹⁸⁻²⁰

LONELINESS

Multiple studies across disciplines have established evidence that the experience of chronic loneliness can increase the risk of developing anxiety, depression, and suicidal behaviors across the life span.²⁻⁵ Furthermore, studies have found evidence that experiencing loneliness in childhood or in adolescence can lead to poor mental and physical health outcomes in adulthood.^{12,14,22} Relevant risk and protective factors such as family social support,^{23,24} school connectedness,^{25,26} friend social support,^{23,25} empathy,²⁷ and self-awareness²⁸ may be associated with adolescent loneliness.

The present study aims to provide insight into how risk and protective factors across the key developmental domains may promote or inhibit adolescent loneliness. Our second aim is to investigate any potential differences across indicators across early adolescence (middle/junior high school students aged 10-13), and middle adolescence (high school students aged 14-18).⁶ This study contributes to social justice goals through its focus on various non-individual level risk and protective factors that may affect adolescent loneliness and by extension adolescent mental health. By identifying environmental factors that contribute to loneliness and mental health more equitable and effective interventions can be developed and implemented and more equitable outcomes can be achieved.

Methods: The study consists of a secondary data analysis based on a quantitative cross-sectional survey distributed to junior high and high school students in an urban school district in Idaho. Data was collected during the 2022-2023 academic school year. This survey aimed to collect information regarding risk and protective factors for the mental health and well-being of teens living in Idaho.

PROCEDURES AND PARTICIPANTS

Students completed the survey via Qualtrics under teacher supervision in their regular classroom and were allowed to skip any question they did not want to answer. Prior to the survey being administered, the school district obtained parental consent and student assent was collected before starting the survey. A total of 7,737 responses were collected, of which 4,154 were Junior high school students and 3,583 high school students in grades 6-12. This sample had an average age of 14.6 years, approximately 75% identified as White/Hispanic-White, and 51% male. The university's institutional review board approved all procedures.

MEASUREMENT AND VARIABLES

This analysis measures risk and protective factors as indicators of the key developmental domains (family, school, peer, and individual). The family domain is indicated by *Family social support* which was measured using the four-item family subscale from the Multidimensional Scale of Perceived Social Support (MSPSS, $\alpha=0.92$).²⁹ The school domain is indicated by *School Connectedness*, a five-item scale (SCS, $\alpha=0.85$).³⁰ The peer domain is indicated by *Friend Social Support*, which was measured using the four-item subscale (MSPSS, $\alpha=0.94$).²⁹ The individual domain was indicated by two variables; *empathy* ($\alpha=0.85$) and *self-awareness* ($\alpha=0.82$). These variables were measured using two subscales from the resilience measure on the California Healthy Kids Survey.³¹

Loneliness, our dependent variable, was measured using the 6-item De Jong Gierveld Social Isolation/Loneliness Scale, which assesses both emotional and social loneliness.³² This is a six-item scale ($\alpha=0.78$) and example questions are: "I experience a general sense of emptiness", "There are plenty of people I can rely on when I have problems" and "There are many people I can trust completely". Participants are asked to select a response that most closely represents their experience on a scale ranging from "None of the time", "Rarely", "Some of the time", "Often", and "A lot of the time".

DATA ANALYSIS PROCEDURES

Data were analyzed using the Statistical Package for Social Sciences (SPSS Version 30). Aim one will employ a Hierarchical Multiple regression approach to assess the patterns of association between the developmental domains and loneliness. Aim two will employ a One-Way ANOVA to assess differences across indicator variables across early and middle adolescence groups.

RESULTS

PATTERNS OF ASSOCIATION ACROSS DEVELOPMENTAL DOMAINS ON LONELINESS

First, bivariate correlations were run to assess association across all key study variables, including the control variables race and gender ([Table 1](#)). A multiple regression analyses was run to assess the patterns of association between the family, school, peer, individual domains, and loneliness while controlling for race and gender. The overall model was significant ($F(7) = 1054.85, p<.001$) with an R^2 of .55, indicating 55% of the variability in loneliness is impacted by contributions of the family, peer, school, and individual domains. Family ($\beta = -0.236$), school ($\beta = -0.222$), peer ($\beta = -0.196$), empathy ($\beta = 0.091$), and self-awareness ($\beta = -0.363$) were significantly associated with loneliness. Loneliness decreased as the scores for the family, school, and peer domains increased. Increases in empathy were significantly associated with an increase in loneliness in this sample.

Table 1. Correlations Between Domain Indicators and Loneliness

Variable	<i>n</i>	<i>M/(%)</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Race ^a	7,373	(75)	--	--							
2. Gender ^b	7,233	(51)	--	-.01	--						
3. Family Social Support	7,519	4.75	1.42	.11**	-.13**	--					
4. School Connectedness	7,399	3.62	0.94	.07**	-.06**	.41**	--				
5. Friend Social Support	7,236	4.89	1.35	.05**	.04**	.28**	.40**	--			
6. Empathy	6,834	3.22	0.75	.08**	.18**	.14**	.20**	.18**	--		
7. Self-awareness	6,820	2.78	0.86	.01	-.18**	.43**	.47**	.25**	.17**	--	
8. Loneliness	6,935	2.60	0.87	-.05**	.16**	-.53**	-.55**	-.43**	-.08**	-.61**	--

Note: *p < .01 **p < .001

^aPercent of sample identifying as "White/Hispanic-White"

^bPercent of sample identifying as "Male"

ASSESSING DIFFERENCES BETWEEN JUNIOR HIGH AND HIGH SCHOOL STUDENTS

One-way ANOVAs were run to compare the differences across these key study variables and the loneliness split between Junior high and high school students. All variables were significantly different across these groups except for friend support. Family support ($F(1,7518) = 45.39, p < .001$) showed significant differences between Junior high ($M = 4.85, SD = 1.38$) and high ($M = 4.63, SD = 1.46$) school students. School Connectedness ($F(1,7398) = 43.04, p < .001$) showed significant differences between Junior high ($M = 3.68, SD = 0.95$) and high ($M = 3.53, SD = 0.93$) school students. Empathy was ($F(1,6833) = 53.05, p < .001$) significantly different between Junior high ($M = 3.16, SD = 0.77$) and high ($M = 3.29, SD = 0.73$) school students. Self-awareness ($F(1,6819) = 51.45, p < .001$) was also significantly different between Junior high ($M = 2.86, SD = 0.88$) and high ($M = 2.71, SD = 0.86$) school students. There was also a significant difference in loneliness ($F(1,6934) = 107.68, p < .001$) between Junior high ($M = 2.50, SD = 0.86$) and high ($M = 2.71, SD = 0.86$) school students. Results found that loneliness, family support, school connectedness, empathy, and self-awareness were significantly different across Junior high and high school students.

Discussion: The purpose of this study was to better understand the patterns of association among risk and protective factors across key developmental domains on adolescent loneliness. The model accounted for 55% of the variability in loneliness which demonstrates the importance of these specific factors and domains in adolescent lives and ultimately, their well-being. The results also showed that each of the domains as well as the risk and protective factors (family social support, school connectedness, friend social support, empathy, and self-awareness) measured within them were significantly associated with adolescent loneliness. This finding is important for both researchers and practitioners to consider as it suggests that multi-level interventions (e.g., interventions that focus on multiple levels of the social ecological model) are highly necessary in future efforts to prevent and address adolescent loneliness and social isolation. More specifically, our analysis showed that while individual-level factors like self-awareness (the greatest contributor across variables in the model) are an important area to focus on to prevent/address adolescent loneliness, so too were indicators across the family, school, and peer domains. Of note is the fact that there were also moderate significant correlations between the family, school, and peer domains with the individual indicators suggesting that focusing on multiple the domains could potentially raise student-level self-awareness, as well as provide other protections against adolescent loneliness. Findings also indicated that junior high students report higher levels of family, peer, and school connection. This is important because the present study shows the protective role of these indicators in each of the key domains across both age groups.

Our study results have implications for public health practice, as they can be readily utilized and/or combined with existing research like Mahon et al.'s (2006) meta-

analysis of the predictors of adolescent loneliness to build programmatic models/interventions to prevent and address youth loneliness and advocate for existing efforts around family and peer and school support and school connection.⁷ Prior research has identified that there is a current dearth of program models/interventions specifically designed to address adolescent loneliness.³³

There is also a need for additional research in this area, particularly related to identifying and modeling additional risk and protective factors in the key developmental domains. Research in this area could facilitate the discovery of additional areas of focus for interventions and programming that target young people as well as those who interact with them like parents, teachers, and other non-parent trusted adults. Additional research efforts are also needed to investigate patterns of adolescent loneliness based on non-modifiable factors like gender and age, personality variables/individual differences like extraversion and shyness, and existing medical (including mental health) diagnoses. The aforementioned meta-analysis from Mahon et al. suggests these areas could be important factors for future inquiry and more research in this area could assist with the identification sub-populations of young people who could most benefit from loneliness interventions.⁷

LIMITATIONS

Several study limitations need to be noted. This study involved a cross-sectional survey, meaning that the survey cannot address any causal pathways regarding loneliness. Additionally, due to the sensitive nature of some of the survey questions, social desirability bias could be present as students may adjust their answers to avoid being viewed unfavorably. Finally, the data comes from one large urban school district that might not be generalizable to all.

Conclusion: By investigating patterns of association between risk and protective factors (organized by adolescent domains) and adolescent loneliness this study provides a valuable contribution to entities seeking to address adolescent loneliness as well as the downstream effects of loneliness like anxiety and depression symptoms and suicidal thoughts and behaviors in adolescents. While additional research is needed to more fully understand loneliness among today's adolescents, this study provides a necessary first step and paves the way for the creation of additional interventions in this area. Additionally, studying adolescent loneliness is crucial for advancing health equity and social justice. By understanding the risk and protective factors for loneliness in adolescents, we can better address disparities in the various adolescent domains impacting loneliness, such as their support systems.

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Table 2. One-Way ANOVA Results Across Groups

Variable	Model 1: Junior High School		Model 2: High School	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Family Social Support	4.85**	1.38	4.62	1.46
School Connectedness	3.68**	0.95	3.54	0.93
Friend Social Support	4.87	1.33	4.90	1.37
Empathy	3.16	0.77	3.29**	0.73
Self-Awareness	2.86**	0.88	2.71	0.83
Loneliness	2.50	0.86	2.71**	0.86

Note: * $p < .01$. ** $p < .001$

DISCLOSURE STATEMENT

The author(s) have no relevant financial disclosures or conflicts of interest.

ABOUT THE AUTHOR(S)

ARCHER WARD

Archer Ward is a Masters of Public Health graduate student at the School of Public and Population Health at Boise State University. Archer is an aspiring researcher with growing interest in adolescent mental health.

ANNE ABBOTT, PHD, MPP

Dr. Anne Abbott is an assistant professor at the School of Public and Population Health at Boise State University. Dr. Abbott's research focuses on developing and studying interventions focused on the primary prevention of interpersonal violence/injury and self-harm in youth and young adult populations. She received her PhD in Community and Behavioral Health with a concentration in Health Communication from the University of Iowa College of Public Health.

JASON SHANKS

Jason Shanks is the Supervisor of Counseling Services in the Boise School District. His roles include supporting counseling staff and guiding the implementation of program-

ming within the schools the district serves. He received his Master's in Counseling from Northwest Nazarene University and his Educational Specialist Degree from the University of Idaho.

TAYLOR NEHER, DRPH, MPH

Dr. Taylor Neher is an assistant professor at the School of Public and Population Health at Boise State University. Her research areas include youth and young adult well-being and mental health. She received her formal training from the University of Arkansas for Medical Sciences.

MEGAN L. SMITH, PHD

Dr. Megan Smith is an adolescent health specialist. She is an associate professor for Boise State's School of Public and Population Health and the founding Director of Communities for Youth, an Idaho Based organization focused on Community-Engaged, Upstream Prevention working on the youth mental health crisis. Dr. Smith received her Ph.D. in Human Development from West Virginia University. Her research focuses on prevention and youth well-being. She is a dedicated public health advocate and deeply believes it is the mission of public health professionals to continue to champion well-being for all.

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SUPPLEMENTARY MATERIALS

Authors

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