



Buffering Child Maltreatment: School Connectedness as a Protective Factor in a Community Sample of Young Adults

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Citation	Goldstine-Cole, Krista. 2020. Buffering Child Maltreatment: School Connectedness as a Protective Factor in a Community Sample of Young Adults. Doctoral dissertation, Harvard Graduate School of Education.
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**Buffering Child Maltreatment: School Connectedness as a Protective Factor
in a Community Sample of Young Adults**

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A Thesis Presented to the Faculty
of the Graduate School of Education of Harvard University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Education

2020

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With thanks to, and in memory of my parents,
Lyn and Jim Goldstine z”l,
who showed me that living our best lives flows from knowing and making our values visible,
and shining a bright and perpetual light on our aspirations;

To my husband and children,
Bill, Joshua, Aaron and Jemmi,
and the families they have made with Lynda, Shoshana and Emily (so far!)
who encouraged me beyond measure,
made countless sacrifices in pursuit of this work,
and show me each and every day how to be full of love and committed to connectedness;

And to all the teachers in my life—in my family, at school, in community and beyond,
who fostered for me a sense of connectedness
and the deep motivation that follows from it.

Acknowledgements

As unlikely as it may seem, this study involving predominately college-enrolled and college-educated young adults from the northeastern United States began in a west coast prison, where I interviewed currently incarcerated men about their memories of school. I was surprised by a common story they told: there was a time they felt like they belonged at school, and then, almost inexplicably, it was gone. They tried to hold on after this rupture, but most could not. I will always be grateful to those men who shared their memories, demons, and aspirations, and through it, encouraged me to look more closely at school connectedness.

Likewise, I will always be grateful to those who helped to shape, guide and support this project, beginning with Martin Teicher, MD, PhD, who, in discussing my prison research with me, offered the opportunity of a lifetime to work with his previously unanalyzed data on protective factors. He is an extraordinary researcher and an unparalleled mentor. Readers will find that one of five indicators in my model of school connectedness is *adults model learning and scholarship*, and nothing delighted me more over the past four years than hearing Marty respond to a table, a figure or a model that failed by saying, “There’s definitely something to learn from this.”

Whenever friends or family unfamiliar with academe ask me about my advisor, Charles Nelson, Ph.D., I tell them, “You know his work whether or not you know his name.” While most are skeptical to begin with, they are filled with awe and recognition when I say simply, “Romanian orphans.” Years in, I continue to be awed and inspired by Chuck’s work and his vision for deepening and expanding it. Learning from Chuck, especially about the critical differences between observational and experimental designs, working with methodologists, and becoming the researcher you want to be over time, was a singular opportunity. There is so much to be said about Chuck’s advocacy through the rigors and challenges of graduate school and grad school life; I am most grateful for his willingness and ability to put *all things* in perspective. It is a gift and it has made all the difference.

Thomas Hehir, EdD helped to oversee my prison work and came out of retirement to sit on my dissertation committee. In any other case, that sentence would say it all. But Tom is a force of nature and I am so grateful for his work on my qualifying paper committee, his mentorship on my dissertation committee, and the years I served on his teaching team for inclusive education and federal education policy. He is simply the most encouraging person I have ever met. I have been immeasurably enriched as a teacher, researcher, and policy advisor through his mentorship. Every semester Tom appoints someone to keep track of his “anecdotes”—which include everything helping adolescents “come out as unable to read,” to being schooled on ableism by Judy Huemann, to getting Congress to agree to the provisions of the 1997 reauthorization of IDEA—and stop him if he had

previously told the story. To be honest, I never once interrupted a retelling when I held the position of “anecdote tzar,” even if he had already shared the story five times that semester. Why would I ever stop a maestro *modeling learning* in every context of their remarkable life? Thank you for sharing so much of that life with me!

In his first year as professor at HGSE, Joseph McIntyre, EdD was chosen by the student body for the Morningstar Family Teaching Award, given for excellence in teaching and advising and “evidence of a caring, respectful, and enthusiastic commitment to students.” I simply could not write a better description of Joe’s mentorship through this dissertation process. He is a terrific methodologist and lover of R who can turn any drawing of a model you bring to his office (or enthusiastically draw on his white board) into equations. Often, we did not meet in his office, though. Instead we met in the open work space of Gutman Library so he would be visible to intro to statistics students who might be too shy or reticent to come to office hours. With Joe, it is completely safe to say, “I don’t understand.” He kindly and patiently supports the journey (and it was *a journey!*) to aha. Joe joined my committee well into my analysis because, as I said to the powers that be, “I need more robust support with my statistics.” I have been grateful for that decision—mine, and Joe’s—every single day since.

This project never could have happened without an army of faculty and mentors who imparted a range of skills and perspectives. Most influential (and beloved) among the many: Katherine Masyn, PhD, now at Georgia State University, Helen Haste, PhD, now retired, Eileen McGowan, EdD, at Harvard Graduate School of Education, and James Caringi at University of Montana. Each of these amazing scholars gave me chance to do something I had never imagined possible and had no idea how to begin.

There is neither time nor space enough to acknowledge all of the peers, colleagues and friends who helped to open my mind, shape my thinking, sharpen my skills and solve the myriad challenges that constitute the doctoral process. In particular, I am grateful to the Doc2012 Cohort; members of the Jones/EASEL lab; fellow early career scholars in civics education; members of the Developmental Biospsychiatry Research Program lab; and the 2016-2019 Boards of the Harvard Educational Review. Especial thanks to those who have become friends and colleagues for life, among them: Nikhit D’Sa, Jessica Elm, Bibi-Zuhra Faizi, Nadirah Farah Foley, Kim Frumin Walters, Amanda Klonsky, Sibylla Leon Guerrero, Tim Matthews, Maung Nyeu, Greg Sawicki, Matthew Shaw, Kim Stevens, Marcus Waldman, and Siwen Zhang-Minero (and all the others whose names I meant to record here!).

Thanks as well to my funders: Harvard University, Harvard Graduate School of Education, and the Spencer Foundation Early Career Scholars in Civics Education Program.

Long before I had the opportunity to pursue this doctorate, Rob Anda and Laura Porter were fostering my learning and preparing the way. Thanks to both of you for the tremendous and life-affirming contributions you have made to my life course as well as this project!

Throughout this undertaking I have had the blessing and support of my family, including my husband of over thirty years, Bill Cole, and our children (and their wonderful partners) Joshua (and Lynda), Aaron (and Emily), and Jemmi. You have brought me great joy and encouragement (and baby Shoshana!) during this process, and continued to build meaningful lives of your own that I am so proud of!

And to my sister, Gigi Worley, who has been my stalwart ally and accomplice through *all* the ups and downs life has thrown our way. I know you can kill a cougar with a spoon, but I sure hope you never have to.

For those who got me started, but were missing at the finish line, your memories will always be a blessing. Lyn & Jim Goldstine, z”l, Eric O. Clarke, z”l, Julie Grevstad, z”l, and Miriam Hall, z”l.

And finally, to all the same-aged women (and the younger ones looking on) who told me they felt inspired by the possibility of a mid-life crisis with red robes rather than a little red roadster, I say: dare to dream it, you can have both!

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Abstract

Child maltreatment is common in the United States: while the child protection system substantiates over 680,000 cases each year, there is clear evidence that a significant portion of abuse and neglect is never referred. Identified or not, maltreatment increases the risk for substance use disorder, depression, anxiety and post-traumatic stress disorder across the lifespan. This study examines whether school connectedness (SC), the sense of belonging at school derived from affective relationships in the school context and commitment to learning, protects against such effects. Specifically, in paper one, data from 349 young adults who completed the Protective Factor Questionnaire is used to develop a retrospective five-indicator, measurement model of school connectedness for K-12 and elementary, middle, and high school. The grade level models are longitudinally invariant, with ω_{τ} ranging from 0.85 for elementary school to 0.82 for high school.

Paper two evaluates SC as a moderator in the relationship between childhood maltreatment and mental well-being during early adulthood, ages 18-25. Results indicate that SC buffers against intrafamilial maltreatment as well as five individual forms of abuse and neglect. By examining the timing of maltreatment as well as SC, I found that SC protected against concurrent as well as past and future maltreatment. Elementary school connectedness emerged as the most powerful protective factor. These results suggest that schools have roles beyond that of mandatory reporter in supporting the well-being of maltreated children.

Chapter One:
Maltreatment, School, and School Connectedness
in Relationship to Mental Well-Being

Too often, children and youth in the United States experience violence and deprivation sufficient to diminish learning, change behavior, or alter the developmental trajectory (NCTSN, 2008). Each year, the child protection system (CPS) substantiates over 680,000 cases of child abuse and neglect after evaluating or investigating approximately four million referrals regarding nearly eight million children (USHHS, 2020). The average daily population in the foster care system is 478,000 children (ChildrensRight.Org, n.d.)¹. Because CPS can act only when referrals are made by mandated reporters or concerned members of the public, studies suggest the majority of abuse and neglect cases involving injury are never reported to formal systems (Gilbert, 2012; NCAN, 2014). Whether or not intervention occurs, maltreatment has deleterious effects on physical (Dong, Anda et al., 2004; Felitti et al., 1998) and mental health (Khan et al., 2015; Teicher & Samson, 2015; Teicher et al., 2006). This dissertation examines the possibility that school connectedness, the feeling of belonging or membership at school derived from affective relationships and commitment to learning (Catalano et al., 2004), can dampen the risk to mental well-being associated with childhood maltreatment.

Maltreatment

¹ *Average daily population* indicates the typical number of individuals using a system on any given day. It is a valuable measure for budgeters and policy makers when the day-over-day use of the system is relatively constant but the particular individuals receiving services changes with regularity. An ADP of 428,000 foster children, for example, provides a foundation for estimating needed resources, including: foster homes, caseworkers, Medicaid use, and judicial proceedings. ADP is neutral with regard to length of stay in foster care, reunification, re-entry, and failed placements.

There are many ways to understand maltreatment. In the United States, the federal Child Abuse Prevention and Treatment Act (amended as the Keeping Children and Families Safe Act, 42 U.S.C.A. § 5106g) sets a minimum standard for states to follow, defining child abuse and neglect as recent acts or failures to act on the part of a parent or caretaker that result in death, serious physical or emotional harm, sexual abuse or exploitation, or that present an imminent risk of serious harm (HHS, nd). There are variations among states, but on the whole, the CPS system is most likely to respond to allegations of physical neglect, physical abuse, and sexual abuse or exploitation (USHHS, 2019). Prior research has uncovered evidence that forms of maltreatment typically not addressed by formal systems have demonstrable effects on child well-being. For example, developmental neurobiologists have found abnormalities in white matter in several functional regions of the brain (Choi et al., 2009), increased gray matter in the superior temporal gyrus (Tomoda et al., 2011), and increased risk of psychiatric disorder (Polcari et al., 2014; Teicher et al., 2010) associated with verbal abuse. Therefore, for research purposes, this dissertation reflects eight forms of intrafamilial maltreatment described by Teicher and Parigger (2015) as part of the Maltreatment and Abuse Chronicity of Exposure (MACE): non-verbal emotional, verbal, physical, and sexual abuse; emotional and physical neglect; witnessing abuse of a sibling and witnessing interpersonal violence between adults in the home.

Health Risks of Maltreatment

The lifelong effects of child maltreatment on health are well documented. Biochemical processes associated with prolonged stress exposure embed adaptations in the brain, epigenome, gut microbiome, and endocrine, immune and metabolic systems

(Berens et al., 2017). In epidemiological studies, the number of types of maltreatment experienced in childhood has a life-long dose-response relationship with a range of health outcomes, including heart disease (Dong et al., 2004), autoimmune disease (Dube et al., 2009), substance abuse (Dube et al., 2003), and suicidality (Afifi et al., 2008; Dube et al., 2001; Thompson et al., 2018).

The relationship between maltreatment and poor mental health is robust both in longitudinal, prospective studies and in retrospective, self-report studies (Schaefer et al., 2018), and includes elevated risk for depression, anxiety, substance abuse, post-traumatic stress disorder, dissociative identity disorder, and anti-social personality disorder (Teicher et al., 2003). Co-occurring parental conflict and substance abuse further heighten mental health risks (McLaughlin et al., 2012). In adulthood, 54 percent of current depression (Dube et al., 2003) and 67 percent of lifetime suicide attempts (Dube et al., 2001) are attributable to the accumulation of child maltreatment and severe family dysfunction. One in four American school children has an identifiable mental, emotional or behavioral health condition (Weare & Nind, 2011); child abuse and neglect account for 45 percent of pediatric onset of psychiatric disorder (Green et al., 2001).

Maltreatment and Risk to Biopsychosocial Development

In addition to biological consequences, Cook and colleagues (2005) identified six domains of biopsychosocial development potentially impaired by complex trauma.² They are: attachment, affect regulation, dissociation, behavioral control, cognition, and self-

² In this formulation complex trauma, the caregiving relationship is altered due to: 1) trauma caused by the caregiver, such as child physical or sexual abuse; 2) caregiver failure to respond to a known harm to the child, e. g. , failure to protect; and 3) simultaneous trauma to both generations which results in adult generation impairment sufficient to prevent appropriate response to the child's needs, in cases such as of natural disaster or violent crime.

concept. Effects of maltreatment in these domains may cascade to relationships and developmental tasks in extra-familial settings, such as school. Difficulties with attention regulation, information processing, and language development within the cognitive domain easily map on to difficulty at school. But the other domains also have implications for education. For example, the behavioral control domain includes “poor modulation of impulses” and “difficulty understanding and complying with rules” (Cook et al., 2015, p. 392); non-compliance at school increasingly results in exclusion from the classroom, which if experienced in the early grades, is associated with subsequent psychopathology and drop out (Skiba & Peterson, 1999).

Further, the attachment domain also has important consequences in school and community contexts. The myriad ways caregivers relate to children—whether responsive or unreliable, for example—result in psychological representation of self as well as others that forms an individual’s expectations of interpersonal relationships in other settings (Cook et al., 2005). At school these representations provide the foundation for peer relationships (Myers & Pianta, 2008). In addition to the importance of having friends to eschew loneliness, peer relationships shape both cognitive development (Vygotsky, 1978) and behavior at school (Bottrell & Armstrong, 2012).

Maltreatment and School Experience

The effects of child maltreatment on learning, socialization and well-being at school are far-reaching. In the short term, child abuse and neglect negatively affect academic performance, behavior, and attendance (Blodgett, 2015; USDOE, 1998). On average, exposed children have lower test scores and grades, and are more likely than peers to repeat a grade (Kinard, 2001; Kurtz et al., 1993; Rowe & Eckenrode, 1999).

They are disproportionately enrolled in special education based on their academic or emotional difficulties (Blodgett, 2015). In addition, maltreated children are more likely than peers to be referred to an administrator for discipline and to be suspended from school (Cicchetti & Toth, 1995; Eckenrode et al., 1993), which too often triggers a cycle of falling behind, disengaging from school, and being re-disciplined until push out or drop out occur (Skiba & Peterson, 1999). In one large, prospective, longitudinal study, poor academic performance early in school predicted depressive symptoms in middle school (Mazza et al., 2010).

In addition to academic troubles, maltreated children often have difficulty with peer relationships. Teachers, parents and peers consistently rate abused and neglected children as less socially competent than non-maltreated peers (Bolger & Patterson, 2001; Rogasch & Cicchetti, 1994). Survivors can be hostile or aggressive (Rogasch & Cicchetti, 1994), making them difficult and potentially untrustworthy friends. Their risk for peer rejection is high, as is risk of loneliness (Bolger & Patterson, 2001; Buhs & Ladd, 2001), which has been explained in prior research by poor self-esteem (Appleyard et al., 2010), shyness or withdrawal (Woodhouse, et al., 2012), and a sense of not mattering to others (Flett et al., 2016). Beyond peer rejection, maltreatment at home is associated with peer physical and verbal victimization (Sansen et al., 2014), which includes persistent physical aggression, exclusion, and being laughed at, insulted or teased (Englander, 2013; Sansen et al., 2014).

School as a Source of Strength

While school is socially and academically difficult for a portion of maltreated children, it is a safe haven for others (Masten, 2014). Healthy adjustment to school is the

primary developmental task of childhood (Lynch & Cicchetti, 1997), as school brings children into contact with social and cultural norms of competence, such as literacy (Masten, 2014). Developing the ability to understand and perform expected tasks is a significant part of healthy adjustment to school. In addition, schooling requires emotional and behavioral self-regulation, forms of executive function that emerge over time with the scaffolding offered by co-regulation and emotional autonomy (Barber & Olsen, 1997). While failure to adjust to school contributes to psychopathology (Cicchetti, 2010), school becomes a source of competence and strength when it supports maltreated children in recognizing, expressing and managing their emotions and behavior (Masten, 2014).

School Connectedness (SC)

One putative protective factor for children is school connectedness. SC is well established in many disciplines, including public health, developmental psychology, and education. It comprises a sense of belonging at school characterized by positive affective relationships and commitment to learning (Arango et al., 2019; Catalano et al., 2004). According to Libbey (2005), there is substantive overlap among the terms school connectedness and school attachment, school bonding, school membership, and school identification. A number of empirical studies have found a positive correlation between SC and academic performance (CDC, 2009) as well as an inverse relationship between concurrent school connectedness and depression, anxiety, suicidality and substance use (Bond et al., 2007; Resnick et al, 1997; Langille et al., 2015), including effects for gay, lesbian, and bisexual youth (Wilson et al., 2008), and victims of bullying (Arango et al., 2019). Arango et al. (2019) and Shochet et al. (2006) demonstrated temporal ordering of effects in multi-year studies.

Protection vs. Protective Factor

School connectedness has been characterized as protective ever since Finn (1989) framed school identification and belonging as precursors to school completion (CDC, 2009; Goodenow & Grady, 1993; Libbey, 2004). In the interceding years, there have been many studies demonstrating correlation between SC and important outcomes, including those related to mental health; for example, Resnick and colleagues (1997) found a strong inverse relationship between SC and emotional distress and suicidal ideation in a large, nationally representative sample of American adolescents. However, it is not clear that SC is conferring protective effects for two reasons. First, there is rarely a risk factor articulated in this type of analysis. It is hard to know if the association between school connectedness and mental or behavioral health would hold up if common risk factors, such as genotype, maltreatment, or family mental health history, were added to the model. Second, a linear model, whether univariate or multivariate, averages across the sample as a whole (Kline, 2016); therefore, it is possible that low-risk or no-risk individuals are driving the observed results and high-risk individuals in the sample are receiving no benefit or protection from SC. Garmezy, Masten and Tellegen (1984) argue that a multilinear relationship that includes a risk factor and one or more putative protectors is compensatory. Statistically, risk and protectors are added together, as in equation 1.1, inferring that harm can be counterbalanced.

Equation 1.1. Equation for Compensatory Model of Protection

$$Outcome = \beta_0 + \beta_1 Risk + \beta_k Compensatory\ Factors + \varepsilon$$

In contrast to the compensatory approach, a protective factor suppresses or blunts the impact of a specified risk (Ungar, 2012); that is, when the protective factor is present,

variation in the risk is less strongly reflected in the outcome of interest (Garmezy at al., 1984). As indicated in equation 1.2, this relationship is indicative of moderation, where the specified risk interacts with the protective factor resulting in a different slope for the relationship between risk and outcome at different values of the protective factor.

Equation 1.2. Equation for Protective Factor Model.

$$Outcome = \beta_0 + \beta_1 Risk + \beta_2 Protective Factor + \beta_3 Risk * Protective Factor + \varepsilon$$

Measuring SC

While SC has been widely studied, measurement tools are limited to adolescents. The two most well-known instruments, the Psychological Sense of School Membership (PSSM) (Goodenow, 1993) and Resnick's (1997) Add-Health, were developed to capture 10- to 18-year-olds' real-time feelings of belonging. Each measure asks respondents to score a series of statements on a Likert scale. Examples include, "I feel like I belong at this school," "I look forward to coming to school" and "People here know I can do good work" (Goodenow, 1993, p. 84)

A few studies have examined the transition to middle school, following 10- to 12-year-olds to observe changes during this critical developmental period. But overall, there is both an absence of elementary school measurement scales and a dearth of information about school connectedness in the elementary school years prior to age 10. Further, there is an absence of tools for assessing SC retrospectively.

While it may be difficult to capture belonging, or any other protective factor, experienced in the past, it is an important issue to undertake, especially in relationship to maltreatment because of data collection challenges when abuse and neglect are at stake. While it is possible to conduct studies with youth who are under the protection of formal

systems or in out-of-home placements, their cases are necessarily limited to the most severe experiences of the types of maltreatment the state responds to. A very large portion of maltreated individuals would not be represented in such a sample (Gilbert, 2012; NCANTP, 2014.). Further, there are significant barriers to recruiting heterogenous samples of maltreated and non-maltreated minors, particularly if the researcher is a mandated reporter under the law, such as a licensed psychologist, physician or educator. Therefore, maltreatment research is often conducted retrospectively, with 18- to 25-year-olds. Absent reliable information about these individuals' protective factors, retrospective researchers may have a difficult time explaining differences in outcomes for subjects with similar risk profiles.

For these reasons, paper one is dedicated to the development of a longitudinally invariant, retrospective school connectedness measurement model. Indicators were derived from the unpublished 115-item Protective Factor Questionnaire created Teicher and Parigger. Given all that has been learned about the mental health risks presented by maltreatment, paper two evaluates school connectedness as a buffer in the relationship between specific forms of intrafamilial maltreatment and mental well-being, giving attention to the timing of both risk and protection.

Outcome of Interest: Mental Well-being

SC has demonstrated an inverse relationship with several mental health conditions, including emotional distress, depression, anxiety, suicidality, substance abuse, and oppositional behavior (CDC, 2009). Due to these associations and the documented relationship between maltreatment and mental health disorder, the outcome of interest in

these analyses is mental well-being. Depression and anxiety, which were originally included in the analytic plan, produced null results.

Mental Health Scales and Initial Analytic Strategy

Participant mental health during the current week was assessed using the 92-item Symptom Questionnaire (SQ). SQ includes four matched pairs of symptom and well-being subscales: anxiety/relaxed, depression/contented, anger and hostility/friendly, and somatic symptoms/wellness. Questions for the subscales are interspersed and constructed so that symptoms and well-being may be scored together or separately (Kellner, 1987). Distress and well-being should not be treated as opposites. An individual may be free of all symptoms of depression, for example, and still not be contented; the absence of well-being adds an additional dimension of emotional distress (Kellner, 1987; Kellner & Sheffield, 1973).

Well-being appears to have unique effects in empirical studies as well. Kidger and colleagues (2012) found that SC predicts future well-being. Polcari and colleagues (2014) found that parental verbal aggression contributed to psychiatric symptoms while verbal affection did not mitigate the effects of verbal aggression nor did it contribute to psychiatric symptoms. Rather, verbal affection was associated with measures of mental well-being. Therefore, the initial analytic plan was to evaluate SC as a protective factor buffering the effects of maltreatment on depression and anxiety as well as mental well-being.

Null Results

No significant evidence emerged in support of the hypothesized interactive influence of SC and maltreatment on symptoms of depression or anxiety. However,

robust results did emerge with respect to mental well-being, particularly the relaxed subscale. The relationship between retrospectively assessed exposure to maltreatment within the family during elementary, middle, and high school, as well as between ages 1-18, was strongly associated with symptoms of depression at the time of data collection (mean age 22.5 years, $SD=2.26$); however, school connectedness did not moderate any of these relationships. Similarly, the relationship between family MACE and anxiety was statistically significant at all grade levels, but this relationship was not significantly moderated by SC at any age.

There are a number of possible explanations for these null findings. For example, there may be observed and unobserved differences in the adult and adolescent samples. It is also possible that SC attenuated or buffered symptoms in adolescence but did not protect against the emergence of disorder during late adolescence or early adulthood. It is more likely there are fundamental differences between modeling an additive linear relationship and a multiplicative moderation of a strong risk factor.

Well-Being Measures

School connectedness proved to have a strong interactive relationship with maltreatment and mental well-being, and specifically the relaxed subscale. As indicated in paper two, protection occurred with the family MACE score, which sums the numbers of types of maltreatment. There are also cases of protection with each of the five individual types of maltreatment, as measured by severity score.

Contributions to the Field

Measurement Model

The longitudinally invariant measurement model of school connectedness developed in paper one opens the door to potential development of similar measures of other protective factors. Access to such measures may support researchers of maltreatment taking a retrospective approach in gaining a fuller understanding of the phenomena of interest. While there is still work to be done to fully validate this measure and to test its efficacy in a range of geographically and ethnically diverse samples, it appears that retrospective measurement may be possible.

Power of Elementary School Connectedness

Perhaps the most pronounced take away in this study is the power of elementary school to protect against some of the adverse mental health consequences of childhood maltreatment. Because primary school connectedness has not been previously studied, this result was surprising. But it is robust: elementary school connectedness moderated every form of maltreatment assessed, except sexual abuse. In most cases, it is the strongest protective factor, explaining greater variance than K-12, middle school or high school connectedness. Time-dependence has the potential to help us identify sensitive developmental periods when investment in protective factors could yield the greatest possible benefit for children. It may also help us to uncover the developmental mechanisms underlying protective effects.

Chapter Two:

Development of a Longitudinally Invariant Retrospective Measure of School Connectedness

Abstract

School connectedness, the sense of belonging at school derived from affective relationship and commitment to learning (Catalano et al., 2004), has long been associated with reductions in poor outcomes such as drug and alcohol use. However, because currently available scales are limited to current status as reported by adolescents, it is necessary to develop a measurement model that accounts for elementary school connectedness and allows for retrospective reporting in order to fully evaluate the role of school connectedness as a protective factor. Using data from 349 young adults aged 18 – 25 (mean=22.55, SD=2.66 years) who completed the 115-item Protective Factor Questionnaire (PFQ), a five-indicator model was developed for K-12 ($\omega_{\tau} = 0.86$), elementary ($\omega_{\tau} = 0.85$), middle ($\omega_{\tau} = 0.82$), and high school ($\omega_{\tau} = 0.85$). The elementary, middle, and high school factors demonstrated strong longitudinal invariance. The five indicators are: adults praised effort and accomplishment, warm relationship with peers, adults modeled scholarship and learning, motivated to learn, and sought help from trusted adults when needed. Similarities to existing scales and implications for practice are discussed.

School connectedness, the sense of belonging at school derived from affective relationships and commitment to learning (Catalano et al., 2004), has long been associated with positive health and wellness outcomes (Arango et al., 2019; Catalano et al., 2004; Hoppe et al., 1998; McNeely et al., 2002). Potential for effects on population rates of substance use, delinquency, and risky sexual activity has driven interest in large-scale interventions to foster school connectedness during adolescence (CDC, 2009).

Warm, respectful relationships with teachers and peers, and motivation to engage with learning activities are indicators of positive adaptation. Successful adaptation to school a central developmental task of childhood (Cicchetti, 1990; Lynch & Cicchetti, 1997; Rutter, 1987) as teachers support socialization (Catalano & Hawkins, 1996), and school conveys core competencies required by society, such as literacy, numeracy, and effective self-regulation (Masten, 2014). Poor adjustment in one domain, such as school, has lasting consequences that may be amplified in subsequent developmental tasks and other domains (Cox et al., 2010; Masten & Cicchetti, 2010; van Lier & Koot, 2010). Poor academic performance, peer rejection, and emotional or behavioral dysregulation increase the risk for exclusionary discipline (Noltemeyer et al., 2015), entry into the juvenile justice system (Shonk & Cicchetti, 2001), dropout (Finn, 1989; Noltemeyer et al., 2015), and incarceration in adulthood (Rosenbaum, 2020). Early academic and peer difficulties predict later mental health problems (Moilanen et al., 2010; Mazza et al., 2010).

Maladjustment to school may arise from a number of life circumstances outside the institution, such as homelessness (Masten, 2014) or exposure to community violence (Sharkey, 2018). Childhood abuse and neglect have particularly deleterious effects on

school adjustment. In addition to lower test scores and grades (Kinard, 2001; Kurtz et al., 1993), maltreated children are more likely than their non-maltreated peers to repeat a primary school grade (Rowe & Eckenrode, 1999), receive special education for learning, emotional or behavioral disability (Blodgett, 2015), and experience suspension from school (Cicchetti & Toth, 1995; Eckenrode et al., 1993).

Although the U.S. child protection system (CPS) substantiates over 680,000 cases of abuse and neglect each year (USHHS, 2020), the majority of children injured by maltreatment are not identified by formal systems (Gilbert, 2012; NCANTP, 2014). Thus, research using administrative data is limited to the most egregious and visible cases. Further, child protection systems are limited in scope, and generally respond only to physical abuse, severe neglect, and incidents of sexual abuse or trafficking (ASPE, 2003); approximately four percent of CPS cases involve verbal abuse, non-verbal emotional abuse or other forms of maltreatment (USHHS, 2020) demonstrated to have significant developmental effects on biological (e.g., Choi et al., 2009; Dong, Anda et al., 2004; Khan et al., 2015) or psychosocial systems (Cook et al., 2004). Finally, recruitment of community samples of minors is hampered by the mandatory reporting obligations of educators, psychologists, and medical doctors likely to be engaged in the research. As a result, matched samples of children in CPS care, and retrospective studies with heterogeneous samples of young adults are common research designs. Accounting for putative protective factors can be difficult in these studies due to the current state of measurement.

The two primary tools for assessing school connectedness, the Psychological Sense of School Membership (PSSM) scale (Goodenow, 1993) and the Resnick's Add-

Health scale (1997) have a common design. Both ask respondents to rank statements regarding their real-time experience along a Likert scale. Examples from the PSSM include “People here notice when I am good at something” and “I am included in lots of activities at (name of school)” (Goodenow, 1993). Examples from the Resnick include “teachers treat students fairly” and “I feel safe at my school” (McNeely et al., 2002). The PSSM was developed for 10- to 18-year-olds because “the need for belonging, social support, and acceptance takes on special prominence in adolescence, particularly during early adolescence” (Goodenow, 1993, p. 81). Resnick’s scale was derived from questions asked by the National Longitudinal Study of Adolescent Health (Add-Health) and consequently, is also intended for use with secondary school students (Resnick, 1997). In her review of “measuring student relationships to schools,” Libbey (2004, p. 274) found that studies of school attachment, belonging, bonding, climate and connectedness typically use the Likert scale approach and include at least some questions from the PSSM or Add-Health. This is likely because the goal is to understand students’ perceptions of “belonging, bonding, and engagement” within the context of their own school community (Lester, Waters & Cross, 2013, p. 2). In both observational (e.g., Arango et al., 2019; Joyce & Early, 2014) and intervention (e.g., Hoppe et al., 1998) studies, school connectedness, as currently measured, has demonstrated an inverse relationship with anxiety, depression, substance abuse and conduct problems.

While extant measures have contributed greatly to our understanding of young people’s behavior, health, and well-being, a retrospective measure is needed in order to support study of childhood maltreatment and adversity, given the role of maltreatment in poor academic and health outcomes. Further, measurement of elementary school

connectedness is indicated as prior research on dropping out of school suggests connectedness as a developmental process beginning with school entry (Finn, 1998), perhaps as early as entry to pre-K (Berruetta-Clement et al., 1984). Therefore, the aim of this study was the development of a measurement model that takes a retrospective approach, includes elementary school connectedness, and can be applied to evaluate differential outcomes in retrospective study of childhood maltreatment or other risk factors. The measurement model was hypothesized to display characteristics of affective relationship with others at school and individual commitment to school values such as learning or academic performance beginning with kindergarten, and to demonstrate model invariance by grade level.

Methods

Sample

The self-reported, retrospective data used to develop this scale of school connectedness were collected between 2010 and 2013 by the Developmental Biopsychiatry Research Program (DBRP) at McLean Hospital as part of two broader neuroimaging studies. This convenience sample consisted of a subset of 349 individuals (146 men, 203 women) who, as part of DBRP's screening, completed two measures of interest, the Protective Factor Questionnaire (PFQ) and the Maltreatment and Abuse Chronology of Exposure (MACE). Participants were aged 18-25 at the time of data collection, with a mean of 22.55 years ($SD=2.26$). They averaged 15.25 ($SD=1.93$) years of education. With respect to child maltreatment, 36 percent ($n=125$) reported no intra-familial maltreatment while 64 percent ($n=224$) reported one or more forms of maltreatment. Demographics are reported by sex in Table 2.1 and by race in Table 2.2.

Table 2.1. Sample Demographics by Sex

	Age (SD)	Race*		Years of Education Attained			Financial Sufficiency (SD)
		White (n)	Non-White (n)	Mother (SD)	Father (SD)	Participant (SD)	
Men	22.58 (2.20)	72.60% (106)	27.40% (40)	15.44 (3.26)	15.91 (3.58)	15.24 (1.97)	3.16 (0.83)
Women	22.53 (2.31)	71.92% (146)	28.08% (57)	15.65 (3.54)	15.59 (3.48)	15.26 (1.91)	3.03 (0.88)
Total	22.55 (2.26)	72.21% (252)	27.79% (97)	15.56 (3.42)	15.72 (3.52)	15.25 (1.93)	3.08 (0.86)

*Categories: American Indian, Asian, Black, Hispanic (not White), Native Hawaiian, multi-race, and White

Table 2.2. Sample Demographics by Race (White and Non-White)

	Age (SD)	Years of Education Attained			Fin Sufficiency (SD)
		Mother (SD)	Father (SD)	Participant (SD)	
White	22.59 (2.24)	15.86 (3.30)	15.90 (3.31)	15.24 (1.85)	3.14 (0.87)
Non-White	22.43 (2.32)	14.79 (3.64)	15.24 (4.02)	15.27 (2.14)	2.93 (0.81)

Recruitment

Participants were recruited in a northeastern U.S. city using advertisements on public transportation labeled “Memories of Childhood.” Volunteers were then screened over the phone for handedness, head trauma, medications, general health, and other thresholds established for the underlying neuroimaging studies. Those who met initial screening criteria were issued the URL and a password for a HIPAA-compliant online enrollment site where demographics were collected, along with a number of scales. While a portion of volunteers for the neuroimaging studies were eliminated due the results of

these scales or subsequent clinical evaluation, all volunteers who completed the computer-based versions of the PFQ and MACE were included in this analysis regardless of their subsequent participation or non-participation in neuroimaging.

Measures

Protective Factor Questionnaire (PFQ). Indicators of school connectedness were selected from the 115-item PFQ, an unpublished instrument developed by Teicher and Parigger. The PFQ asks respondents to indicate first whether they ever experienced each item during childhood (yes/no) and then to check off every age at which they recalled having the experience, yielding a possible frequency score of 0-18 for each item. PFQ data has not been previously analyzed. For purposes of this study, responses for ages 0-4 were not used, while responses for ages 5-10 were scored as elementary school (ES), ages 11-14 were scored as middle school/junior high (MS), ages 15-18 were scored as high school (HS). In addition, ages 5-18 were aggregated as kindergarten through twelfth grade (K-12). PFQ items related to relationships within, activities at, and commitment to school were identified using the methods described below.

Covariates and grouping variables. Participants provided demographic data, including sex, race, years of education, parents' educational attainment, and perceived childhood financial sufficiency, assessed on a five-point scale where 1 was defined as "much less than enough money for our needs" and 5 was defined as "much more than enough money for our needs."

Analysis

Development of the measurement model for school connectedness followed Kline's (2016) recommended three-step process: 1) establish the construct through theory

and/or empirical literature; 2) identify candidate indicators that sample each facet of the construct; and 3) fit and evaluate the model, using multiple fit indices to guide any re-specification.

Establish the construct. While school attendance is legally required in most western industrialized countries, student engagement cannot be mandated. The school connectedness construct is used in psychology, education, and public health to reflect the conditions necessary to motivate full participation and effort by students (Goodenow & Grady, 2003; Libbey, 2004). School belonging, bonding, attachment, and membership, are often used interchangeably with school connectedness, and significant conceptual overlap exists across empirical studies relying on this construct regardless of its naming (Libbey, 2004). In their review, Catalano and colleagues (2004) distilled two essentials of school connectedness: “1) attachment, characterized by close affective relationships with those at school; and 2) commitment, characterized by an investment in school and doing well at school” (p. 252). This conceptualization mirrors Finn’s (1989) identification-participation model, which posits belonging with others at school and valuing of education as the predicates for school completion. Thus, SC was operationalized here as positive relationship and relational acts with those at school and commitment to learning.

Identify candidate indicators. Candidate indicators for school connectedness were derived from the broader PFQ instrument based on Catalano et al.’s (2004) two-part description. A number of questions on the PFQ addressed relationship at or commitment to school directly; for example, “Please indicate all the years in which you felt that educators at school used praise and positive reinforcement.” All items of this kind were included in data reduction. Other questions addressed similar issues without specifying a

direct relationship to school; for example, “Please indicate all the years in which you experienced praise for your efforts and accomplishments.” When items did not specify school, but were adjacent to items regarding teachers, peers at school, or school activities, they were included as potential indicators as it was assumed respondents might reasonably associate such questions with their experience of school. In addition, questions related to the quality of relationships with peers, teachers and coaches were identified as candidate indicators.

There were no questions on the PFQ related to attendance at school, GPA, or enrollment in honors classes, which are often used as proxy for pro-school commitment. However, the PFQ did include a number of questions about pro-school values and activities; for example, respondents were asked to indicate “all the years in which you were interested and motivated to do well at school,” “all the years in which you were curious to learn new things and took pleasure in mastering new skills,” and “all the years you regularly read for fun.” These questions were also included as candidates. Because it can be argued that participation in extracurricular activities indicates attachment to or investment in school (Arango, 2019; McNeely et al., 2002), questions regarding participation in sports, teams, clubs, and “extra opportunities to learn new things” were also considered as possible indicators.

Finally, questions regarding parental commitment to school and academic achievement were included. These ranged from “the years in which one or more of your parents or guardians assisted you in completing assigned homework or checked to see that you completed and handed in assignments” to “the years in which one or more of your parents or guardians encouraged you to accept and be responsible for your actions at

school and at home.” It was expected that parental values would be internalized over the course of development, potentially producing non-invariance by age.

Data were reduced using principle component analysis (PCA). Six items related to family support, and no other topic, loaded onto a single component, suggesting a separate construct. Similarly, participation in teams, clubs and out-of-school learning opportunities, along with having a great coach, formed a unique component. In addition, several indicators failed to load or had low values in a four-factor solution. Items constituting extracurricular activities and parental support, as well as items that failed to load were eliminated as candidates for school connectedness, resulting in eleven indicators to be tested using confirmatory factor analysis (CFA). Those sampling affective relationship were: warm relationship with teacher; warm relationship with peers; felt safe at school; adults at school were fair; adults praised effort and accomplishment; and adults modeled learning and scholarship. Those sampling school commitment were: curious to learn new things; motivated to do well at school; sought help from trusted adults when needed; friends behaved; and resisted pressure from peers to participate in risky or unacceptable behavior.

Fit the model. Beginning with the eleven candidate indicators identified, a progression of CFA models was fit for ES, MS, HS and K-12 in MPlus 8.1 using the MLR estimator (Muthén & Muthén, 2017). MLR does not assume multivariate normality, corrects for skew and, if warranted, the degree of kurtosis in the raw data (Kline, 2016) such that $SB\chi^2_{ML} * correction\ factor$ (Satorra & Bentler, 2010). As indicated in Table 2.3, most candidate indicators demonstrated a degree of skew and/or kurtosis.

ES, MS, HS, and K-12 were fit separately and model fit was evaluated using a combination of absolute and relative fit statistics to address limitations in available measures (Kline, 2016; Little, 2019) and to minimize Type I and Type II errors (Hu, Bentler, & Kano, 1992). Statistical fit was evaluated using the MLR-corrected $SB\chi^2$, which indicates the precise amount of change between the observed covariance structure and the model implied covariance structure such that a non-significant value, although difficult to obtain with a larger sample size, is preferred (Kelloway, 2015; Kline, 2016; Little, 2019). Absolute fit was evaluated by root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR), which indicate the magnitude of difference between a perfect replication of the data and the solution such that a value of 0.10 indicates a 10 percent difference. While SRMR values less than .08 indicate a good fit (Hu et al., 1992), RMSEA values less than or equal to 0.07 are generally preferred (Steiger, 2007). However, due to the method for calculating RMSEA, upward bias occurs with simpler models (Kline, 2016) and larger sample size (Little, 2019). Therefore, Kline's (2016) recommendation to use the RMSEA's 90 percent confidence interval with a maximum upper value of 0.10 to indicate acceptable fit was applied. Relative fit was assessed using the Comparative Fit Index (CFI), which indicates the degree of difference between the null model and the solution, such that 0.9 indicates the solution is 90 percent better than the null (Little, 2019). CFI values of greater than 0.95 are preferred (Hu et al., 1992; Kline, 2016).

Contribution to shared variance. In CFA, indicator variables are conceptualized as having two causes, the latent construct and error (Kline, 2016) such that the observed score is expressed as:

Equation 2.1. Equation for Construct Score.

$$X_i = C_i + M_i + O_i + O_{ti} + S_i + e_i$$

where C is the true score for the construct, M is method variance, O_i is occasion error affecting all individuals, O_{ti} is occasion error specific to an individual, S is item specific error and e is all other error (Little, 2019). Given self-reported, retrospective data, it was expected that the size of error terms might be somewhat large.

Results

Descriptive Statistics

Candidate indicators for school connectedness were relatively common, based on responses to the PFQ, which asked participants to indicate at what ages, if any, they experienced 109 putative protective factors. As indicated in Table 2.3, during the school years, ages 5-18, the mean number of years participants reported experiencing the candidate indicators ranged from 5.8 (SD=4.77) out of 14 years for “had warm relationship with a teacher” to 11.76 (SD=4.33) for “felt safe at school.” Among the five indicators in the final CFA, frequency ranged from a low of 8.22 (SD=5.43) years for “sought help from trusted adults” to a high of 10.13 (SD=4.33) years for “had warm relationships with peers.” Although there was some variation by indicator and grade level, the distributions for the indicators were bimodal with peaks at 0 and 14 years. Most items skewed to the left. The skew and kurtosis of these non-normal distributions indicated use of the MLR estimator.

The correlations among indicators varied by grade level. In the elementary school years, the pair “feeling safe at school” and “resisting peer pressure” had the lowest correlation ($\rho = 0.183$) while “adults praised effort and accomplishment” and “motivated

to do well at school” had the highest ($\rho = 0.620$). In middle school, “curious to learn” and “friends behaved” had the lowest correlation ($\rho = 0.260$). As in elementary school, praise and motivation had the strongest correlation ($\rho=0.599$) during the middle school years. In high school, “adults model learning and scholarship” and “warm relationship with teacher” had the lowest correlation ($\rho = 0.215$), while “warm relations with peers” and “felt safe at school” had the highest ($\rho=0.621$). When looking across all grades, “adults model learning and scholarship” and “felt safe at school” produced the lowest correlation ($\rho = 0.288$) while “adults praised effort and accomplishment” and “motivated to do well at school” had the highest ($\rho = 0.679$). In CFA, indicators should be moderately correlated to ensure that the items both cohere as a single construct and diverge sufficiently to capture all aspects of the construct (Kline, 2016).

Elementary school. The 11-indicator ES model produced sub-optimal fit ($SB\chi^2=131.539$, $df=44$, $p=0.0000$, $RMSEA=0.076$ [0.061, 0.091], $SRMR=0.048$, and $CFI=0.926$). Several of the indicators had low factor loadings and R^2 , and the mod indices indicated that “curious to learn” and “motivated to do well at school” likely measured the same thing. The six items with an R^2 value of less than 0.40 were eliminated and the model re-specified as a five-item CFA that sampled both the affective relationship and commitment to school facets of school connectedness. This ES model produced excellent fit ($SB\chi^2=8.681$, $df=5$, $p=0.122$, $RMSEA=0.046$ [0.000, 0.096], $SRMR=0.019$, and $CFI=0.992$) and the model had good reliability ($\omega_\tau = 0.85$).

Middle school. The 11-indicator MS model had mediocre fit ($SB\chi^2=148.019$, $df=44$, $p=0.0000$, $RMSEA=0.082$ [0.068, 0.097], $SRMR=0.052$, $CFI=0.907$). Although the R^2 for “adults modeled learning and scholarship” did not reach the 0.40 threshold

applied in fitting the elementary school model ($R^2=0.33$), this item was retained in order to evaluate a solution parallel to ES. This approach allowed for the possibility of an age invariant model. Using the 5 indicators from ES provided excellent model fit for MS ($SB\chi^2=8.763$, $df=5$, $p=0.119$, $RMSEA=0.046$ [0.000, 0.096], $SRMR=0.023$, $CFI=0.990$) and the model had good reliability ($\omega_\tau = 0.82$).

High school. The procedure was replicated for high school, producing an ill-fitting 11-item HS model ($SB\chi^2=127.406$, $df=44$, $p=0.0000$, $RMSEA=0.074$ [0.059, 0.089], $SRMR=0.047$, $CFI=0.918$). While a few items, such as “safe at school” rose above the 0.4 threshold for R^2 used to establish the ES model, the five indicator solution used for ES and MS produced excellent fit for HS ($SB\chi^2=6.450$, $df=5$, $p=0.026$, $RMSEA=0.029$ [0.000, 0.084], $SRMR=0.019$, $CFI=0.996$) and good reliability ($\omega_\tau = 0.82$).

K-12. The 11-indicator model for all grades had poor fit ($SB\chi^2=226.676$, $df=44$, $p=0.0000$, $RMSEA=0.109$ [0.095, 0.123], $SRMR=0.056$, $CFI=0.885$). The initial five-indicator solution used for ES, MS and HS produced adequate fit ($SB\chi^2=18.426$, $df=5$, $p=0.0025$, $RMSEA=0.088$ [0.047, 0.132], $SRMR=0.027$, $CFI=0.975$). Mod indices suggested that “praised for effort and accomplishment” and “warm relations with peers” likely co-vary (13.375). Reliability for this model was very good ($\omega_\tau = 0.87$). When this path was added, K-12 model fit improved ($SB\chi^2=6.148$, $df=4$, $p=0.188$, $RMSEA=0.039$ [0.000, 0.097], $SRMR=0.016$, $CFI=0.996$, $effort\ with\ peers=0.301$ ($se=0.069$)). Reliability for this model was very good ($\omega_\tau = 0.86$).

Most parsimonious versus best-fitting K-12 model. The most parsimonious five-indicator model for grades K-12, depicted in Figure 1, had very good reliability,

TABLE 2.3.

Distribution of Candidate Indicators: Proportion of Participants Reporting 0-14 Years of Experience by Indicator, with Skew and Kurtosis by Grade Level (n=349).

Indicators	Number of Years Indicator Experienced (% of participants)														ES		MS		HS		K12				
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	\bar{X}	SE	Skew/	Kurt	Skew/	Kurt	Skew/	Kurt	Skew/	Kurt
	17.8	3.4	8.3	8.9	8.6	10.6	6.9	4.9	3.4	3.1	1.4	2.6	2.9	3.1	14.0	5.80	0.746	0.586	-1.100	0.586	-1.322	-0.430	-1.585	-0.430	-1.585
Warm relationship with teacher	10.3	1.4	1.4	4.9	4.9	5.4	3.4	4.9	3.1	5.2	3.7	5.4	5.2	8.6	32.1	9.12	0.362	-0.531	-1.100	-0.531	-1.322	-1.319	-1.585	-1.319	-1.585
Warm relationship with peers	6.6	2.0	0.6	0.9	1.7	0.9	1.7	0.9	0.9	2.0	2.0	2.9	3.4	6.0	67.6	4.95	-1.686	-1.485	-1.100	-1.485	-1.322	0.015	-1.585	0.015	-1.585
Felt safe at school	13.2	2.3	1.1	0.6	2.6	2.0	2.9	1.1	2.3	3.1	3.1	4.6	4.9	8.3	47.8	10.17	-1.045	-1.094	-1.100	-1.094	-1.322	-0.972	-1.585	-0.972	-1.585
Adults at school were fair	10.3	2.3	1.1	4.6	1.7	3.1	4.0	4.3	1.4	1.7	2.0	2.6	2.3	2.9	55.6	5.18	-0.736	-0.614	-1.100	-0.614	-1.322	-0.905	-1.585	-0.905	-1.585
Adults praised effort /accomplishment	20.9	0.9	2.6	2.6	3.7	3.4	3.7	2.9	1.7	2.6	3.4	2.3	1.1	5.7	42.4	8.67	-0.260	-0.536	-1.100	-0.536	-1.322	-0.833	-1.585	-0.833	-1.585
Adults modeled learning/scholarship	12.3	2.0	2.3	2.0	6.9	5.4	4.3	3.7	2.3	3.7	3.7	4.0	3.4	6.3	37.5	9.01	-0.176	-0.684	-1.100	-0.684	-1.322	-1.325	-1.585	-1.325	-1.585
Curious to learn new things	10.3	2.3	0.6	4.3	3.4	2.3	2.0	4.3	4.0	4.0	3.4	4.9	6.0	11.5	36.7	5.22	-1.831	-1.372	-1.100	-1.372	-1.322	-0.040	-1.585	-0.040	-1.585
Motivated to do well at school	17.2	2.9	2.9	3.1	3.4	4.9	5.7	2.6	4.9	3.4	4.9	5.2	2.3	2.9	33.8	8.22	-0.147	-1.711	-1.100	-1.711	-1.322	-0.721	-1.585	-0.721	-1.585
Sought help from trusted adults	10.6	2.0	1.7	2.3	2.6	4.9	3.1	3.7	4.6	4.6	2.9	7.2	4.6	4.3	41.0	5.43	-1.854	-0.536	-1.100	-0.536	-1.322	-1.324	-1.585	-1.324	-1.585
Friends behaved	15.2	2.0	2.3	2.6	4.3	6.6	5.4	4.6	5.2	7.7	3.4	5.4	4.9	4.6	25.8	8.13	0.215	0.484	-1.100	0.484	-1.322	-1.065	-1.585	-1.065	-1.585
Resisted pressure from peers	5.07	-1.805	-1.555	-0.639	-0.324	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999	-0.999										

TABLE 2.4. Final Five-Indicator School Connectedness Measurement Models by Grade Level

MODEL	SB χ^2 (<i>df</i> , <i>p</i>)	RMSEA [90% CI]	SRMR	CFI	Loading (SE)	Intercept (SE)
Elementary School	8.681 (5, 0.122)	0.046 [0.000, 0.096]	0.019	0.992		
Praised for effort					0.831 (.030)***	1.685 (.097)
Warm peer relations					0.709 (.040)***	1.315 (.068)
Motivated to do well					0.735 (.039)***	1.461 (.079)
Ask for help					0.694 (.037)***	1.149 (.059)
Adults model scholarship					0.669 (.042)***	1.212 (.063)
Middle School	8.763 (5, 0.119)	0.046 [0.000, 0.096]	0.023	0.990		
Praised for effort					0.852 (.028)***	1.650 (.094)
Warm peer relations					0.596 (.047)***	1.484 (.077)
Motivated to do well					0.702 (.043)***	1.769 (.103)
Ask for help					0.694 (.038)***	1.300 (.066)
Adults model scholarship					0.609 (.045)***	1.386 (.075)
High School	6.450 (5, 0.265)	0.029 [0.000, 0.084]	0.019	0.996		
Praised for effort					0.799 (.038)***	1.958 (.121)
Warm peer relations					0.711 (.049)***	2.054 (.129)
Motivated to do well					0.757 (.043)***	2.025 (.126)
Ask for help					0.626 (.043)***	1.545 (.085)
Adults model scholarship					0.558 (.051)***	1.561 (.089)
K12 Unconstrained	18.426 (5, 0.003)	0.088 [0.047, 0.132]	0.027	0.975		
Praised for effort					0.890 (.023)***	1.954 (.106)
Warm peer relations					0.726 (.040)***	1.844 (.090)
Motivated to do well					0.765 (.036)***	1.969 (.106)
Ask for help					0.725 (.034)***	1.517 (.072)
Adults model scholarship					0.649 (.043)***	1.503 (.075)
K12 Covarying Error Terms	6.148 (4, 0.188)	0.039 [0.000, 0.097]	0.016	0.996		
Praised for effort					0.847 (.030)***	1.957 (.106)
Warm peer relations					0.660 (.046)***	1.847 (.090)
Motivated to do well					0.785 (.035)***	1.972 (.106)
Ask for help					0.746 (.034)***	1.520 (.072)
Adults model scholarship					0.678 (.042)***	1.502 (.075)
Effort with peers					0.301 (.069)***	

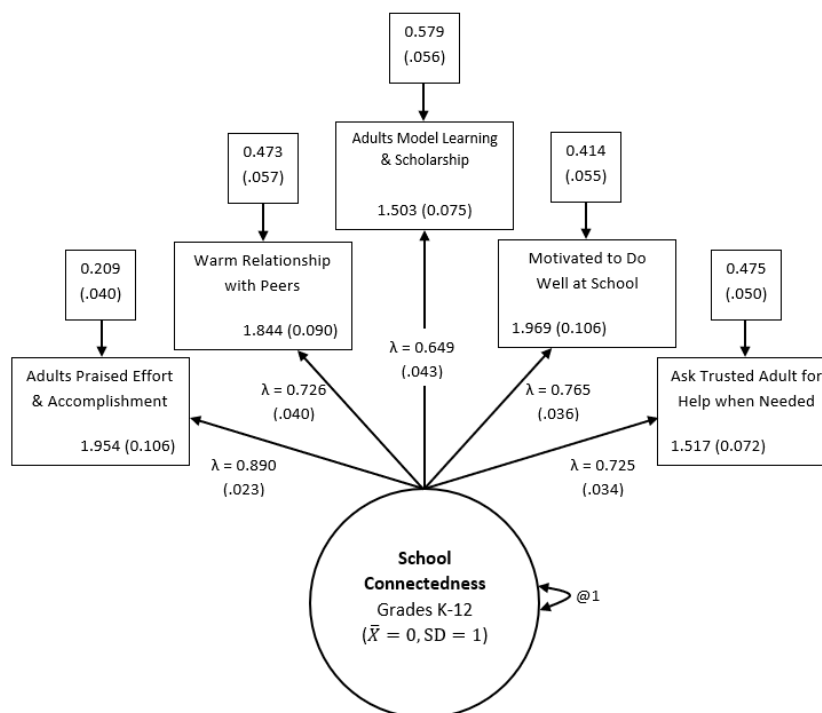
*** $p \leq 0.001$

excellent SRMR and CFI. However, the model had a statistically significant SB χ^2

(SB $\chi^2=18.089$, $df=5$, $p=0.0028$) and the top value for the 90 percent confidence interval

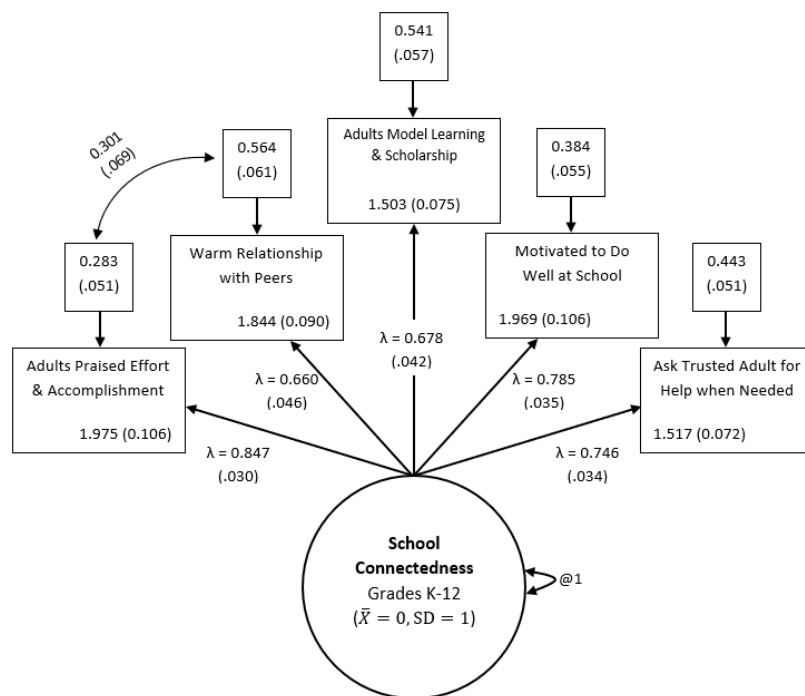
for RMSEA exceeds the recommended 0.1 threshold (CI 0.046, 0.131). Further, the modification indices suggested co-variance between “praised for effort and accomplishment” and “warm relationship with peers.” The better fitting model, depicted in Figure 2, includes a path between “adults praised effort and accomplishment” and “warm relationship with peers,” (estimate=0.30, se=0.069). The improvement in model fit ($SB\chi^2=5.938$, $df=4$, $p=0.069$, $RMSEA=0.037$ [0.000, 0.095]) is likely due to isolation of true error, including method, measurement, and occasion error, in the item uniquenesses. Adopting the better fitting model would indicate that this co-variance is believed to be true for the population as a whole (Little, 2019). It is more likely that these two error terms co-vary in this sample due to method and measurement error, as these two questions are in the same section of the PFQ and the sample is relatively homogeneous in terms of age, race, and years of education completed.

FIGURE 2.1. Parsimonious Five Indicator Model Grades K-12 Fit with MLR (N=349)



($\chi^2 = 18.426$, $df = 5$, $p = 0.002$, $cf = 1.148$, $RMSEA = 0.088$ [0.047, 0.132], $SRMR = 0.027$, $CFI = 0.975$)

FIGURE 2.2. Best-Fitting Five-Indicator Model Grades K-12 Fit with MLR (N=349)



($\chi^2 = 6.148, df = 4, p = 0.188, cf = 1.181, RMSEA = 0.039 [0.000, 0.097], SRMR = 0.016, CFI = 0.996$)

Validity

This five indicator CFA rises to the threshold for content validity, as described by Kline (2106). Specifically, the scale comports the established literature, including Catalano et al.'s (2004) description of school connectedness and Finn's (1989) identification-participation model. Both require indications of positive relationships at school as well as commitment to school. Absent comparison to established measures or scales, this model does not rise to the level of construct validity at this time (Kline, 2016). It is important to note that construct validity is neither singular nor permanent (Kline, 2016). Rather a construct, as well as its measures, is likely to need refinement over time (Westen & Rosenthal, 2003). Even established scales may move away from validity if the

use of the scores they produce or the social implications of score use tax the appropriateness of the measure's interpretation over time (Kane, 2013; Messick, 1995).

Longitudinal Measurement Invariance

The ES, MS and HS models exhibited strong invariance, suggesting that the relationship between the factor and the indicators is consistent across time. Longitudinal measurement invariance evaluates whether the factor structure fits the data equally well at each modeled point in time (Kline, 2016). Longitudinal invariance occurs along a continuum from weak to strong; testing for strict invariance is not recommended for evaluating factor models over time as indicator variances include random occasion error, contraindicating an assumption of equality (Little, 2013). Weak invariance requires equality of unstandardized factor loadings and strong invariance requires equality of unstandardized intercepts. Given the use of the MLR estimator, change in model fit is determined by change in CFI of 0.01 or less.

Table 2.5. Longitudinal Measurement Invariance Testing across ES, MS & HS

Model	χ^2	df	CFI	Δ CFI	Pass?
Configural	120.92	72	0.987		
Weak	129.98	80	0.987	.00	Yes
Strong	175.41	88	0.977	.01	Yes

Discussion

This study sought to develop a retrospective, longitudinally invariant measurement model with indicators of positive affective relationship at and commitment to. A well-fitting model, five indicator model emerged for ES, MS, HS, and K-12. The ES, MS and HS models demonstrated strong invariance. School connectedness, operationalized here as affective relationships at school and commitment to school or pro-school values (Catalano et al., 2004). An initial principle component analysis of PFQ

data resulted in 11 candidate indicators. CFA was used to produce the final models, which demonstrated very good reliability ($\omega_{\tau} = 0.84 - 0.87$).

While the commonly used measures of school connectedness have centered adolescence (CDC, 2009; Goodenow, 1993; Goodenow & Grady, 1993; Libbey, 2004; McNeely et al., 2002; Resnick et al., 1997), it should not be a surprise that school connectedness is relevant throughout K-12 education, and invariant by age group. The need for belonging and the quest for connectedness is universal and persists across social contexts (Baumeister & Leary, 1995). Connectedness is also a developmental phenomenon (Lynch & Cicchetti, 1997), suggesting that school connectedness extends beyond the middle grades. In fact, there is evidence of school connectedness shaping the academic trajectory as early as pre-K (Finn, 1989). The results are also consistent with motivation and education literatures, which posit a developmental process of belonging or relatedness as a necessary precursor or pre-requisite to engagement in learning (e.g., Baumeister & Leary, 1995; Finn, 1989; Lynch & Cicchetti, 1997; Maslow, 1962; Weiner, 1990).

Failure to connect results in poor adaptation or psychopathology (Baumeister & Leary, 1995). In the school context, lack of connection is associated with poor motivation (Skinner & Belmont, 1995); lack of agentic engagement in school work (Reeve, 2013), and drop out (Finn, 1989). Work to identify the mechanisms underlying school connectedness demonstrate longitudinal reciprocal processes that result in deepening school engagement and motivation for those who perceive relatedness with the teacher and teacher support early in the school year (Lynch & Cicchetti, 1997; Skinner &

Belmont, 1995; Skinner et al., 2008). Still, it is important to consider why the current measures appear to persist across grade levels.

Indicators were selected to sample both facets of the theoretical framework drawn from Catalano et al. (2004), affective relationships at school and commitment to school. Two of the five items in the final measurement model, “experienced a warm, friendly relationship with peers” and “motivated to do well at school,” directly reflect theoretical construct and require little explanation. The remaining items are more nuanced, but draw deeply from our understanding of competence, teacher support, trust, and agentic engagement.

“Experienced praise for your efforts and accomplishments” is akin to the PSSM (Goodenow, 1993) item “people here notice when I am good at something.” Giving and receiving praise occurs in relationship with others, and carries a positive emotional valance such that routine praise for both effort and accomplishment may endure over time. But in addition, offering praise requires the one giving praise to notice a behavior, skill, work product, or trait of the one receiving praise. Receiving praise has the effect of being seen or validated within the relationship, of others noticing being good at something, or as another PSSM item states, “people here know I can do good work.” One item on the PFQ is, at first glance, strikingly similar to “experienced praise for your efforts and accomplishments,” that is, “educators at school used praise and positive reinforcement.” The two items had very similar means (10.14 and 10.50 years, respectively, for K-12); however, the correlation between the items ranges from 0.49 for high school to 0.59 for all grades. Knowing that positive reinforcement happens within the school does not ensure being noticed or praised. Perceived teacher support early in

the school year drives student motivation, engagement, and academic achievement (Lynch & Cicchetti, 1997; Reeve, 2013; Skinner & Belmont, 1993; Skinner et al., 2008). A dynamic relationship between the indicator and positive engagement in academics helps to explain not only the contribution of this item to the construct of school connectedness, but its persistence across grade levels.

The indicator had “adults you could use as a role model for scholarship and learning,” like praise for effort, occurs within the context of relationship. Further, to model learning requires that the adult involved reveal some degree of not knowing. For example, a teacher might model learning by responding to a student question with, “I don’t know. How might we find out?” or “I am curious about that, too. What do you think the answer might be?” In this formulation, the item may share characteristics with the PSSM items about being taken seriously and being respected. In modeling not knowing, adults generate a highly relevant connection to students’ positionality. Further, revealing vulnerability fosters trust within a relationship (Brown, 2014). Respondents who were in relationship with adults who modeled scholarship and learning may well have developed relevant knowledge and skill they continue to draw on, in addition to experiencing a deeper trust, which helps to explain the persistence of this item across ages.

The final indicator, “sought help from trusted adults” is perhaps the most complex item in the measurement model as it is open to interpretation. For some respondents, it may reflect accessing emotional or practical support; the PSSM item “I have at least one teacher I can talk to if I have a problem” parallels this interpretation. Access to needed resources within the young person’s developmental ecology fosters not only resilience,

but competence as well (Ungar, 2018). For other respondents, this item may reflect help seeking for the purpose of learning or completing learning tasks; for example, by asking for assistance with homework. Such help seeking is central to agentic engagement in the classroom (Reeve, 2013). Asking questions reflects curiosity, persistence, or involvement and tends to draw teacher support in a reciprocal dynamic (Skinner & Belmont, 1993). Students who withdrawal from rather than engaging in agentic ways are at risk for anxiety, depression, and drop out (Finn, 1997; Joyce & Early, 2014). It is likely that this item persists across grade levels because help seeking is central to classroom structures (Skinner et al., 2008) as well as popular pedagogical approaches, such as gradual release of responsibility, also known as “I do, we do, you do” (Pearson & Gallagher, 1983; Rodriguez-Arroyo & Lowenstein, 2013).

Currently available indices measuring school connectedness are oriented to real-time data collection among adolescents. The questions are oriented to current states such as “I can really be myself at this school” (PSSM, Goodenow, 1993) and “I am happy to be at this school” (Add-Health, Resnick et al., 1997). While use of these tools has deepened our understanding of a range of issues, including drop out (e.g., Finn, 1989), initiation of substance use (e.g. Hoppe et al, 1998), and suicidal ideation in adolescence (Arango et al., 2019), the development of this five-indicator measurement model and the finding of longitudinal invariance suggest that there is much more to be learned about school connectedness in developmental processes and outcomes.

Limitations and Future Directions

There are two items from the Add-Health (McNeely et al., 2002; Resnick, 1997), also commonly used by other researchers (Libbey, 2004) that did not contribute

sufficiently to the latent construct: teachers are fair and safe at school. Their absence may be an artifact of this primarily white sample, which reported a high degree of financial sufficiency during childhood and an average of 15.64 years of parental education. Nearly half of participants (n=167) reported “educators were fair and consistent with rules and discipline” every year from age 5 to 18, and two-thirds (n=236) reported feeling safe at school every year from age 5 to 18. Alternatively, adult understanding of these concepts, fair and safe, is transformed in adulthood making them less powerful in a retrospective measurement model. Given the importance of fairness and safety in the education literature, future research should continue to test these items with more diverse populations.

Most data collected by DBRP for its underlying studies is retrospective. While there is reason to believe that retrospective child maltreatment data are reliable (see Teicher & Parigger, 2015 for an excellent discussion), protective factor data may be more vulnerable to distortion or failed memories. It is reasonable to assume that young adults, aged 18-25, may not remember whether they were 6 or 7 when their teacher was unfair. Approaches to assessing bias include test-retest and comparison of results from multiple instruments. For example, it would be possible to administer both the PSSM and the PFQ to juniors and seniors in high school and to re-administer the PFQ two years later.

While evidence regarding bias should be pursued, there is strong evidence that *perception* of teacher relatedness and teacher support drives school engagement, including affective experiences like boredom and anxiety in the classroom (Skinner & Belmont, 1993, Skinner et al., 2008; Reeve, 2013). Absent the perception of belonging, individuals are unable to understand and adhere to group norms (Reeve, 2013), and are

unlikely to persist in the school context (Finn, 1989). Further, it is relatedness that organizes individual development across the lifespan (Lynch & Cicchetti, 1997).

Therefore, to the extent that participants' responses reflect their perceptions of belonging at school, it is likely they document facets of developmental processes.

Finally, while the measurement models presented here demonstrate excellent fit, reliability and content validity, they do not yet rise to the level of construct validity. It will be important to test this tool in two ways. First, the model must be tested to see if it performs as expected as a protective factor. Does school connectedness moderate the impact of risk? Second, to be fully validated, its performance should be measured against other instruments. This will be challenging as current tools are geared towards middle and high schoolers, so a comparison would be delayed by several years.

Implications

While numerous psychologists have described school connectedness as a developmental process, in the absence of a measure that includes the early grades, we cannot fully understand the etiology of protection, assess the likelihood of sensitive developmental periods, or make accurate predictions regarding outcomes ameliorated by the protective influence of school connectedness. Further, without a tool, researchers who measure the effects of child maltreatment and adversity using a retrospective approach cannot integrate or control for protective factors. The five-indicator model developed here shows promise in helping to close this gap.

In addition to implications for risk and protection research, this model indicates actions educators could take in order to foster school connectedness. Praise for effort and accomplishment suggests formative evaluation or mastery learning approaches that

provide students with feedback for their next steps. Similar to Dweck's (2015) growth mind set, this indicator should encourage educators to notice and praise behaviors students can control, such as being attentive, making an effort to participate in group work, or handing in assignments within the context of outcome goals. Offering encouragement is a necessary element of motivation (Skinner & Belmont, 1993).

Modeling scholarship and learning invites adults to reveal their own thinking or problem-solving strategies. In addition, educators can engage in learning together, for example, by asking student questions by saying, "I don't know, let's find out together." Similarly, teachers can foster autonomy, another driver of motivation (Skinner & Belmont, 1993; Skinner et al., 1990), by encouraging students to make a plan to find answers for their questions, and creating opportunities for students to follow that plan.

Seeking help from a trusted adult when needed may suggest a passive role for educators. However, being open to student problems, familiar with available resources, and willing to take time can foster a climate in which students feel able to ask for help. Signaling willingness to be a support to students whether by establishing a club or posting a safe space poster may help to set the tone.

The two remaining indicators, warm relations with peers and being motivated to learn, are to a high degree, dependent on student behavior. But like help seeking, these items suggest the need for adults to cultivate a positive climate. Prior research on the value of school connectedness suggests that such efforts can have lasting impacts in the classroom and beyond.

Chapter Two Appendix

TABLE 2.6. Indicator School Connectedness Measurement Models by Grade Level

MODEL	SB χ^2 (<i>df</i> , <i>p</i>)	RMSEA [90% CI]	SRMR	CFI	Loading (SE)	Intercept (SE)
ES all indicators	131.539 (44, 0.000)	0.076 [0.061, 0.091]	0.048	0.926		
Teachers fair					0.614 (.045)***	1.761 (.104)
Friends behave					0.612 (.044)***	1.596 (.089)
Safe at school					0.485 (.051)***	2.120 (.125)
Praised for effort					0.812 (.024)***	1.688 (.098)
Warm teacher					0.560 (.034)***	0.819 (.039)
Warm peer relations					0.729 (.034)***	1.312 (.068)
Curious					0.610 (.044)***	1.183 (.060)
Motivated to do well					0.739 (.036)***	1.464 (.079)
Resist peer pressure					0.534 (.040)***	0.985 (.049)
Ask for help					0.692 (.033)***	1.151 (.059)
Adults model scholarship					0.658 (.039)***	1.208 (.063)
MS all indicators	148.019 (44, 0.000)	0.082 [0.068, 0.097]	0.052	0.907		
Teachers fair					0.606 (.048)***	1.830 (.109)
Friends behave					0.555 (.048)***	1.560 (.083)
Safe at school					0.609 (.051)***	2.363 (.164)
Praised for effort					0.802 (.026)***	1.653 (.094)
Warm teacher					0.531 (.035)***	0.897 (.042)
Warm peer relations					0.640 (.041)***	1.487 (.077)
Curious					0.630 (.043)***	1.532 (.083)
Motivated to do well					0.733 (.037)***	1.773 (.103)
Resist peer pressure					0.626 (.042)***	1.446 (.074)
Ask for help					0.696 (.034)***	1.303 (.066)
Adults model scholarship					0.582 (.046)***	1.384 (.074)
HS all indicators	127.380 (44, 0.000)	0.074 [0.059, 0.089]	0.047	0.918		
Teachers fair					0.543 (.051)***	1.710 (.099)
Friends behave					0.561 (.052)***	1.782 (.103)
Safe at school					0.681 (.052)***	2.600 (.194)
Praised for effort					0.749 (.036)***	1.962 (.121)
Warm teacher					0.568 (.040)***	1.383 (.072)
Warm peer relations					0.757 (.038)***	2.057 (.129)
Curious					0.671 (.045)***	2.025 (.128)
Motivated to do well					0.741 (.039)***	2.028 (.126)
Resist peer pressure					0.632 (.043)***	1.847 (.109)
Ask for help					0.651 (.036)***	1.549 (.085)
Adults model scholarship					0.521 (.051)***	1.564 (.089)
K-12 all indicators	226.676 (44, 0.000)	0.109 [0.095, 0.123]	0.056	0.885		
Teachers fair					0.655 (.045)***	1.969 (.114)
Friends behave					0.640 (.046)***	1.937 (.102)
Safe at school					0.667 (.047)***	2.725 (.197)
Praised for effort					0.849 (.021)***	1.957 (.106)
Warm teacher					0.631 (.028)***	1.220 (.046)
Warm peer relations					0.760 (.033)***	1.847 (.090)
Curious					0.696 (.038)***	1.732 (.084)
Motivated to do well					0.782 (.033)***	1.972 (.106)
Resist peer pressure					0.653 (.035)***	1.610 (.076)
Ask for help					0.722 (.031)***	1.520 (.072)
Adults model scholarship					0.621 (.044)***	1.502 (.075)

Table 2.7. Pairwise Correlations among Indicators, by Grade Level

Elementary School					
	Praise	Warm peers	Model	Motivated	Ask for help
Praised for effort	1.0				
Warm relationship with peers	0.615	1.0			
Adults model learning	0.539	0.435	1.0		
Motivated to do well	0.620	0.501	0.508	1.0	
Ask adults for needed help	0.554	0.498	0.523	0.499	1.0
Middle School					
	Praise	Warm peers	Model	Motivated	Ask for help
Praised for effort	1.0				
Warm relationship with peers	0.533	1.0			
Adults model learning	0.516	0.281	1.0		
Motivated to do well	0.599	0.414	0.434	1.0	
Ask adults for needed help	0.575	0.419	0.478	0.483	1.0
High School					
	Praise	Warm peers	Model	Motivated	Ask for help
Praised for effort	1.0				
Warm relationship with peers	0.595	1.0			
Adults model learning	0.451	0.332	1.0		
Motivated to do well	0.587	0.542	0.450	1.0	
Ask adults for needed help	0.487	0.433	0.382	0.484	1.0
K-12					
	Praise	Warm peers	Model	Motivated	Ask for help
Praised for effort	1.0				
Warm relationship with peers	0.679	1.0			
Adults model learning	0.558	0.407	1.0		
Motivated to do well	0.679	0.530	0.528	1.0	
Ask adults for needed help	0.627	0.508	0.549	0.562	1.0

Table 2.8. School connectedness questions on PSSM, Add-Health and PFQ

PSSM (Goodenow, 1993)	Add-Health (Resnick et al., 1997)	PFQ
I feel like a real part of this school	I feel close to people at this school	All the years in which you experienced praise for your efforts and accomplishments
People here notice when I am good at something	I feel like I am a part of this school	All the years in which you had a warm friendly relationship with peers at school
It is hard for people to accept and accept me (reverse coded)	I am happy to be at this school	All the years in which you felt there was an adult you could use as a role model for scholarship and learning
Others at school take my opinions seriously	Teachers treat students fairly	All the years in which you were interested and motivated to do well at school
Most teachers are interested in me	I am safe at school	All the years in which you sought help from trusted adults
Teachers here are not interested in people like me (reverse coded)		
I am included in lots of activities at this school		
I am treated with as much respect as other students		
I feel very different from other students here		
I can really be myself at this school		
Teachers respect me		
People here know I can do good work		
I wish I were at a different school (reverse coded)		
I feel proud of belonging to this school		
Other students like me the way I am		

Chapter Three:
**Time-dependent protective effects of school connectedness on mental well-being in
adults with histories of maltreatment: A retrospective study**

Abstract

Although childhood maltreatment has been linked to worse psychological outcomes in adulthood, the impact of school connectedness (SC) on this relationship is not well understood. This study examined whether SC acted as protective factor by moderating the linear relationship between intrafamilial maltreatment in childhood and psychological well-being in early adulthood. Using data from 348 young adults, SC and maltreatment were calculated for lifetime as well as elementary, middle, and high school to evaluate the buffering, inoculation, and rescue qualities of school connectedness as a protective factor. Maltreatment was measured via the Maltreatment and Abuse Chronology of Exposure Scale (MACE) and psychological well-being via the symptom questionnaire (SQ). Linear regression with interaction terms showed that SC at all three timepoints provided significant protection in the relationship between childhood maltreatment and with SQ subscale for relaxed, but not contented, friendly or somatic well-being. The results indicate particularly powerful effects of elementary SC on later psychological well-being. Efforts to improve SC throughout childhood, particularly targeting youth at high risk of maltreatment at home, could therefore yield improvements in later adult outcomes.

Violence against children, including physical, sexual and emotional abuse, is widespread and deleterious to healthy development (WHO, nd). In the United States alone, authorities investigate allegations of maltreatment involving nearly 8 million children each year, substantiating nearly 700,000 cases (USHHS, 2020). True prevalence is believed to be much higher as three-quarters of children injured by maltreatment are never reported to formal systems (NCANTP, 2014). These experiences are often sufficient to diminish learning, change behavior, or alter the developmental trajectory (NCTSNSC, 2008). Consistent with principles of multifinality (Wilden, 1980), maltreatment has been associated with adaptations in the brain, epigenome, gut microbiome, and endocrine, immune and metabolic systems (Berens et al., 2017). Deleterious effects include poor mental (e.g., Teicher et al., 2003), physical (e.g., Dong, Anda, et al., 2004) and behavioral (e.g., Dube et al., 2003) health, disorganized attachment (Cicchetti, 2010; van Ijzendoorn et al., 1999), psychosocial deficits in cognitive, emotional and behavioral self-regulation (Cook et al., 2005; Hong et al., 2012; Shonk & Cicchetti 2001), and maladjustment to school (Lynch & Cicchetti, 1997). Abused and neglected children are more likely than non-maltreated peers to repeat a primary grade (Rowe & Eckenrode, 1999), receive special education (Blodgett, 2015), and experience suspension from school (Cicchetti & Toth, 1995; Eckenrode et al., 1993). Teachers and peers consistently rate maltreated children as less socially competent than others (Bolger & Patterson, 2001; Rogasch & Cicchetti, 1994). Further, they suffer disproportionate peer rejection, loneliness (Bolger & Patterson, 2001; Buhs & Ladd, 2001), and peer physical and verbal victimization (Sansen et al., 2014).

Given the myriad risks, survivors of maltreatment experience differential outcomes. For example, a significant portion of adults who experienced maltreatment suffer from depression, accounting for 54 percent of the lifetime occurrence in the population (Dube et al., 2003); however, the majority of survivors do not experience mood disorder (Edwards et al., 2003; Ohashi, et al., 2019). These differences may result from a variety of conditions, including the timing of maltreatment (Khan et al., 2015), specific adaptations in the brain (Ohashi et al., 2019), or the presence of protective factors (Garmezy et al, 1989; Ungar, 2018).

Protective factors include individual traits (Rutter, 2006), life experiences (Garmezy et al., 1989), or ecological conditions or resources (Ungar, 2018) that suppress risk or dampen the association between a risk factor and its consequences (Garmezy et al., 1989, Masten, 2013; Ungar, 2012). While the mechanisms underlying protective factors are not fully understood, there are three major frameworks that help to explain the curbing of risk. The first builds on Bronfenbrenner's ecological theory of development, and suggests that resources embedded in the social ecology, including relationships, cultural values, and material supports, work together with an individual's strengths to shape a more positive developmental trajectory (Ungar, 2012; Ungar 2018). The second, from the field of developmental psychopathology, posits that protective factors help to produce a range of competencies, particularly social-emotional skills (Burt et al., 2008; Shonk & Cicchetti, 2001), capacity for self-regulation (Garmezy et al., 1984), or socially expected proficiencies, such as literacy and numeracy (Masten, 2014). The third builds on Bowlby's conceptualization of attachment (Bond et al., 2007), and posits that bonding to people and institutions continues well beyond infancy (Barber & Olsen, 1997; Cox et

al., 2010) Opportunities for bonding, as well as positive attachment help to explain diminished risk (Bond et al., 2007; Catalano & Hawkins, 1996). The primary aim of this study is to evaluate the time-dependent effects of school connectedness, a putative protective factor, on the relationship between childhood maltreatment and mental well-being at ages 18-25.

Relevant Literature

School connectedness (SC) reflects an individual's sense of belonging at school derived from affective relationships and commitment to learning (Arango et al., 2019; Catalano et al., 2003). At this time, the primary tools for assessing SC are the Psychological Sense of School Membership (PSSM) scale (Goodenow, 1993) and the Resnick Add-Health scale (Resnick, 1997). Both ask youth ages 10 to 18 to respond to statements using a Likert scale; for example, "People here notice when I am good at something" (Goodenow, 1993) and "I feel safe at my school" (McNeely et al., 2002). Researchers examining SC, or related constructs such as school attachment, belonging, or bonding, have typically used a similar format and related statements (Libbey, 2004). Although Finn (1989) described coming to identify or connect with school as a developmental process beginning with introduction to school, measurement tools have been limited to adolescence and pre-adolescence due to the salience of peer relationships during this period (Goodenow 1993, Goodenow & Grady, 1993; McNeely et al., 2002; Resnick, 1997).

Understanding of SC has contributed significantly towards efforts to improve youth and community outcomes (CDC, 2009). However, existing measures are silent on elementary school, and due to constraints in collecting maltreatment data with minors,

real-time measures of SC are difficult to apply in evaluating the effects of SC in relationship to childhood abuse and neglect. In order to expand understanding of school connectedness as a protective factor in relationship to childhood maltreatment, I developed a five-indicator retrospective measure for K-12 as well as elementary, middle and high school (see Chapter Two) to be used in this analysis. The indicators of affective relationship are: adults praised effort and accomplishment, warm relationship with peers, and adults modeled scholarship and learning. The indicators for commitment to learning are: motivated to learn and sought help from trusted adults when needed.

Using extant measures, a number of investigators have reported a positive correlation between SC and academic performance (CDC, 2009), as well as an inverse relationship between concurrent school connectedness and depression, anxiety, suicidality and substance use (Bond et al.; Resnick et al, 1997; Langille et al., 2015), including effects for gay, lesbian, and bisexual youth (Wilson et al., 2008), as well as victims of bullying (Arango et al., 2019). Arango et al. (2019) and Shochet et al. (2006) demonstrated temporal ordering of effects in multi-year studies. While symptoms of mental health disorder and well-being are inversely correlated (Kellner, 1987), the absence of psychological well-being amplifies vulnerability in the face of subsequent adversities (Ryff & Singer, 1996). For example, when children appear anxious, depressed, passive, withdrawn, or rebellious early in their relationship with a teacher, they receive less attention, help or positive reinforcement than children with positive affect (Skinner & Belmont, 1993; Skinner & Wellborn, 1990). Motivation, engagement, and commitment to learning plummet compared to enthusiastic peers, reinforcing teacher

behavior and leaving vulnerable students academically behind (Skinner & Belmont, 1993).

The correlational results typical in this literature reflect compensatory effects; that is, the outcome varies by school connectedness such that SC counteracts or compensates for risk (Garmezy et al., 1984). Compensation, measured by linear or multilinear regression, contrasts to a protective factor, which suppresses or blunts the impact of a particular risk (Ungar, 2012). Statistically, a protective effect is supported by the finding of an interaction between the risk factor and the protector (Garmezy et al., 1989; Rutter, 2004; Ungar, 2012), such that when the protective factor is present, variation in the risk factor is less strongly reflected in the outcome of interest (Garmezy et al., 1984).

Although SC has garnered interest as a putative protective factor (CDC, 2009; Goodenow & Grady, 1993; Libbey, 2004), it remains unclear whether SC functions as a protective factor in the face of child maltreatment. In one study using a protective factor approach, Markowitz (2017), found that SC buffered the relationship between early adversity and depressive symptoms in early adolescence, late adolescence and early adulthood. Early adversity was determined by asking participants in waves three and four (grades 11 and 12) of the National Longitudinal Study of Adolescent Health whether they had experienced any of nine parenting behaviors representative of emotional, physical and sexual abuse (yes/no), and if so, at what ages. They were considered to have experienced early adversity if maltreatment or contact with a social services agency occurred prior to age 6. This study extends prior research by asking whether SC functions as a protective factor, and if so if it buffers against concurrent, future or past maltreatment. I hypothesized: 1) that SC would act as a protective factor, moderating the

effects of accumulated intrafamilial maltreatment as well as individual types of abuse and neglect on psychological well-being; and 2) when examined by elementary, middle and high school, SC would provide protection against concurrent maltreatment.

Methods

Sample

The sample consisted of 348 young adults (147 men, 201 women,) aged 18-25 (mean=22.55, SD=2.26 years) at data collection. Based on federal racial categories, 72.2 percent (n=252) identified as white and 27.8 percent (n=97) identified as non-white or multiracial. The respondents averaged of 15.23 years of education (SD=1.89) while their parents averaged 15.61 years (SD=3.19). Their mean financial sufficiency growing up was 3.07 (SD=0.88) on a five-point scale where 1 was defined as “much less than enough money for our needs” and 5 was defined as “much more than enough money for our needs.” Demographics are reported by sex in Table 3.1.

Table 3.1. Sample Demographics by Sex

	Age (SD)	Race*		Years of Education Attained			Financial Sufficiency (SD)
		White (n)	Non-White (n)	Mother (SD)	Father (SD)	Participant (SD)	
Men	22.58 (2.20)	72.60% (106)	27.40% (n=40)	15.44 (3.26)	15.91 (3.58)	15.24 (1.97)	3.16 (0.83)
Women	22.53 (2.31)	71.92% (146)	28.08% (n=57)	15.65 (3.54)	15.59 (3.48)	15.26 (1.91)	3.03 (0.88)
Total	22.55 (2.26)	72.21% (252)	27.79% (n=97)	15.56 (3.42)	15.72 (3.52)	15.25 (1.93)	3.08 (0.86)

*Racial categories: American Indian, Asian, Black, Hispanic (not White), Native Hawaiian, multi-race, and White

Recruitment

Participants were recruited as part of two NIH awards to Martin H. Teicher at McLean Hospital / Harvard Medical School, which were focused on maltreatment, sensitive periods, brain changes and risk for psychopathology. Individuals who responded to advertisements on public transportation labeled “Memories of Childhood” were screened over the phone for handedness, history of head trauma, and other thresholds established for the underlying studies. Those who met screening criteria were issued the URL and a password for a HIPAA-compliant online enrollment site where demographic data were collected along with a number of assessments. While a portion of volunteers were eliminated from the broader studies due the results of these scales or subsequent clinical interviews, all volunteers who completed the computer-based Protective Factor Questionnaire (PFQ) and the Maltreatment and Abuse Chronology of Exposure (MACE) were included in this analysis, regardless of their ultimate participation or non-participation in neuroimaging. Brain scans have been completed on 33 of the 348 participants.

Measures

Mental well-being. Participant mental health during the current week was assessed using the 92-item Symptom Questionnaire (SQ) (Kellner, 1987), which includes matched symptom and well-being subscales for anxiety/relaxed, depression/contented, anger and hostility/friendly, and somatic symptoms/wellness. Questions for the subscales are interspersed and constructed so that symptoms and well-being may be scored together or separately (Kellner, 1987). When scored independently the maximum for each symptom subscale is 17 with higher values indicating greater distress. The maximum for

each well-being subscale is 6 with higher scores indicating greater state of relaxation, contentedness, friendliness or somatic wellness. When combined, well-being is reverse coded, bringing the possible symptoms score to 23, as the absence of well-being adds another dimension to emotional distress (Kellner, 1987; Kellner & Sheffield, 1973).

Child maltreatment. Child abuse and neglect was assessed by the 52-item Maltreatment and Abuse Chronology of Exposure (MACE) scale developed by Teicher and Parigger (2015). Respondents were asked first to indicate whether or not they ever experienced specific events, and then to check off all the ages at which the abusive behavior occurred; for example, parents, stepparents or other adults in the house “intentionally pushed, grabbed, shoved, slapped, pinched, punched or kicked you.” The format allows for scoring the chronicity of maltreatment, the severity of exposure at each age, or the number of types of maltreatment experienced over the course of childhood (Teicher & Parigger, 2015). The MACE has demonstrated overall reliability ($r=0.91$, $n=75$) as well as good to excellent reliability at each age and for each type of maltreatment (Teicher & Parigger, 2015). For purposes of this study, eight forms of intra-familial maltreatment were used: physical, sexual, verbal, and non-verbal emotional abuse; physical and emotional neglect; witnessing abuse of a sibling and witnessing interpersonal violence between adults in the household.

School connectedness (SC). SC was assessed using a five-indicator measure derived from Teicher and Parigger’s unpublished 115-item Protective Factor Questionnaire (PFQ). The SC indicators are: adults praised effort and accomplishment, warm relationship with peers, adults modeled learning and scholarship, motivated to do well at school, and asked trusted adults for help when needed. Elementary school

connectedness measures ages 5-10 ($\omega_{\tau} = 0.85$), middle school measures ages 11-14 ($\omega_{\tau} = 0.82$), and high school measures ages 15-18 ($\omega_{\tau} = 0.82$). The aggregate K-12 measure includes ages 5-18 ($\omega_{\tau} = 0.87$) (see Chapter Two of this dissertation).

Grade level. Because education is regulated at the state and local level in the United States, there is variation in the grades assigned to elementary school, middle school or junior high, and high school. There is also variation in the age of kindergarten enrollment for children with summer and fall birthdays. For purposes of this analysis, ages 5-10 were grouped together as elementary school (ES), ages 11-14 were grouped together as middle school (MS) and ages 15-18 were grouped together for high school (HS).

Covariates. Participants provided demographic data, including sex, parents' educational attainment, and perceived childhood financial sufficiency.

Analysis

Does SC protect psychological well-being in the face of maltreatment? To evaluate SC as a protective factor, each subscale was regressed on family MACE using Stata 15.1 (Stata Corp, 2017). Once a statistically significant linear relationship was established, K-12 SC was interacted with the risk factor such that:

$$\text{Well-Being}_{\text{subscale}} = \text{Constant} + \beta_1 \text{MACE} + \beta_2 \text{SC} + \beta_3 \text{MACE} * \text{SC} + \beta_4 \text{sex} + \beta_5 \text{parent ed}$$

Individual factor scores for K-12, elementary, middle and high school connectedness were generated separately using a fixed factor approach in MPlus 8.1 (Muthén & Muthén, 2017). The resulting z-scores ranged from -1.64 to .98 for K-12, -1.70 to .89 for ES, -2.34 to .80 for MS, and -2.05 to .98 for HS.

To what extent does SC function as a protective factor in the face of grade-level specific maltreatment? Given the results of question 1, this phase of analysis focused exclusively on SQ Relaxed, the well-being measure associated with anxiety. A series of 16 time-dependent conditional linear models were fit using Stata 15.1 (Stata Corp, 2017). The progression of models began with the relationship between SQ Relaxed and the general measure for family MACE. This score reflects the total number of categories of MACEs (0-8) experienced over the course of childhood. Model was fit with, in turn with K-12 SC in interaction with MACE, ES in interaction with MACE, MS in interaction with MACE and HS in interaction with MACE. Next family MACE occurring during ES was fit. This score reflects the total number of types of maltreatment (0-8) occurring during the elementary school years, age 5-10. This was followed by family MACE occurring during middle school and family MACE occurring during high school. Although the total possible family MACE score over the course of childhood is 8, a particular form of maltreatment could occur during multiple years that span elementary, middle and/or high school.

Finally, the relationships between the SQ relaxed score and each individual type of maltreatment comprising the family MACE were assessed. The six types of maltreatment demonstrating a statistically significant relationship with well-being were then interacted with school connectedness in the same progression as used for the composite family MACE score. During this phase of analysis, severity scores, based on the number of indicators endorsed out of a possible 10 for each type of abuse in each year, were used (Teicher & Parigger, 2015). This resulted in a maximum possible score of 60 for each type of maltreatment occurring during ES (10 possible items x 6 years) and

a maximum of 40 for each type of maltreatment occurring during MS and HS (10 possible items x 4 years).

Results

Prevalence of Maltreatment

During the first 18 years of life, 36.2 percent of participants (n=126) experienced no intra-familial maltreatment, while 45.1 percent (n=157) experienced one to three forms of maltreatment and 18.7 percent (n=65) experienced four or more forms of abuse and neglect. The distribution is similar to the U.S. Behavioral Risk Factor Surveillance System, which found that 38.5 percent of 214,517 respondents experienced no maltreatment before age 18, 45.7 percent experienced one to three types of maltreatment, and 15.8 percent experienced 4 or more types, based on the Adverse Childhood Experiences Score (Merrick et al., 2018).

Moderating Influence of School Connectedness on Specific Measures of Well-being on the Symptom Questionnaire

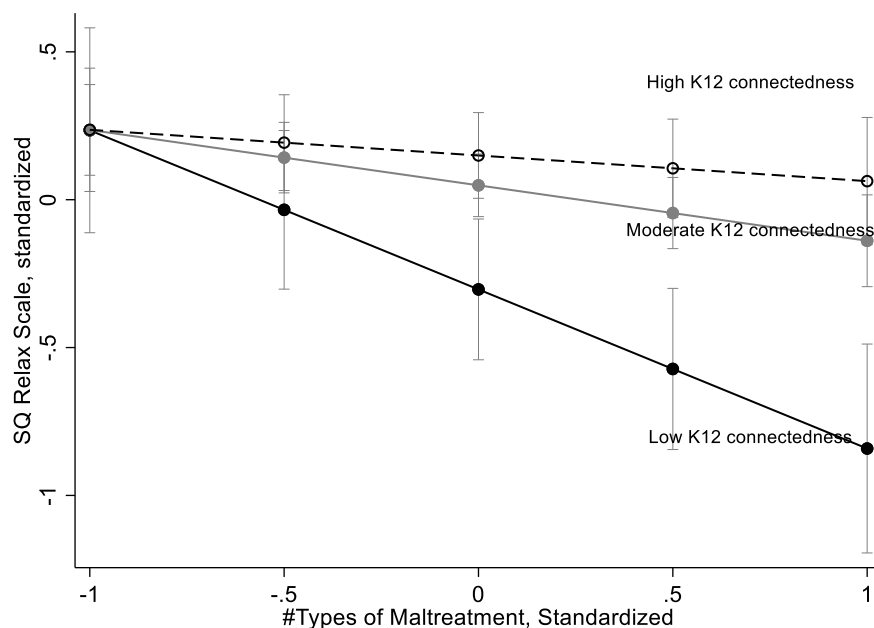
To establish whether SC protects psychological well-being in the context of childhood maltreatment, each wellness subscale was regressed on family MACE. All associations were statistically significant and in the expected direction. After controlling for sex and parent education, SQ friendly was no longer statistically significant ($\beta = -0.107, p = 0.061$); therefore, regression analyses were performed to assess whether there were significant interactions between interfamilial MACE and K-12 SC on the three remaining indices of mental well-being. As reported in Table 3.2, K-12 SC did not moderate the effects of intrafamilial MACE on contented ($\beta_{\text{MACE} \times \text{K-12}} = 0.027, p = 0.711$) or wellness ($\beta_{\text{MACE} \times \text{K-12}} = -0.054, p = 0.454$), but did moderate the relation between

interfamilial MACE and relaxed ($\beta_{\text{MACE} \times \text{K-12}} = 0.182, p = 0.012$). Figure 3.1 illustrates the interactive effect of SC on the regression slope between interfamilial MACE and SQ relaxed for prototypical values of SC 5th (low), 50th (mid) and 95th percentile (high).

Table 3.2. Relationship between family MACE and wellness scales assessing the interaction between MACE and K-12 SC. Values presented are standardized β coefficients (p -value).

	Coef	β MACE (p -value)	β Interact (p -value)	β K-12 SC (p -value)	β Sex (p -value)	β Parent Ed (p -value)
SQ Relaxed	5.71	-0.234 (0.000)	0.182 (0.010)	0.012 (0.862)	-0.099 (0.055)	-0.094 (0.083)
SQ Contented	5.51	-0.230 (0.000)	-0.027 (0.711)	0.030 (0.681)	0.050 (0.343)	-0.012 (0.822)
SQ Well	4.04	-0.198 (0.000)	-0.054 (0.454)	0.124 (0.085)	-0.125 (0.017)	0.002 (0.966)
SQ Friendly	4.88	-0.107 (0.061)			0.003 (0.959)	0.006 (0.911)

Figure 3.1. Linear interaction between Lifetime Family MACE and Prototypical values of K-12 School Connectedness on SQ Relaxed Scores. Graphed values 5th, 50th and 95th percentile of SC and 95% confidence intervals.



Moderating Influence of Grade-Specific SC on the Relationship Between Intrafamilial Maltreatment and Relaxed Ratings

In order to more clearly assess whether SC operates solely as a concurrent buffer or also protects against future and past maltreatment, family MACE and SC were divided into grade specific exposure levels. As reported in Table 3.3, SC the interaction between family MACE and SC was statistically significant in a number of situations. Lifetime, as well as ES, MS and HS family MACE were negatively correlated with the relaxed subscale, when controlling for sex and parent education. K-12 SC moderated the relationship between lifetime ($\beta=0.142$, $p=0.010$), ES ($\beta=0.117$, $p=0.028$), MS ($\beta=0.163$, $p=0.002$), and HS ($\beta=0.100$, $p=0.043$) family MACE and SQ relaxed scores.

When broken down by grade level, SC continued to behave as a potential protective factor. SC occurring during ES interacted with lifetime ($\beta=0.148$, $p=0.007$), ES ($\beta=0.127$, $p=0.015$), MS ($\beta=0.176$, $p=0.001$), and HS ($\beta=0.107$, $p=0.028$) intrafamilial maltreatment on SQ relaxed ratings. MS connectedness proved more limited, interacting with family MACE during the MS years ($\beta=0.142$, $p=0.009$). HS connectedness interacted with lifetime ($\beta=0.129$, $p=0.020$) and MS ($\beta=0.124$, $p=0.020$) intrafamilial maltreatment on relaxed ratings. ES connectedness proved to be a particularly robust protective factor against future and concurrent maltreatment. In these analyses the interactive effect of SC during specific grade levels on intrafamilial maltreatment controlled for the influence of SC at the other grade levels.

Table 3.3. Main and interactive effects of intrafamilial maltreatment and school connectedness by grade groupings on the SQ relax scale. Values are beta weights (se).

	Coef	MACE (se)	SC (se)	MACE*SC (se)	Sex (se)	Parent Ed (se)
Family MACE (all ages)	-7.51e-10	-0.235*** (.055)			-0.102* (.052)	-0.093 (.055)
K-12 SC moderates	0.002	-0.234*** (.054)	0.143 (.051)	0.142** (.055)	-0.099 (.052)	-0.034 (.054)
ES SC moderates ⁺	0.003	-0.231*** (.054)	0.011 (.091)	0.148** (.054)	-0.101 (.051)	-0.094 (.054)
HS SC moderates ⁺⁺⁺	-0.002	-0.245*** (.055)	0.142 (.084)	0.129* (.055)	-0.101 (.052)	-0.091 (.054)
ES family MACE	3.64e-09	-0.229*** (.056)			-0.118* (.052)	-0.102 (.056)
K-12 SC moderates	0.006	-0.226*** (.055)	0.128 (.052)	0.117* (.053)	-0.112* (.052)	-0.100 (.055)
ES SC moderates	0.004	-0.228*** (.055)	0.030 (.092)	0.127* (.053)	-0.122* (.052)	-0.097 (.055)
MS family MACE	-2.52e-09	-0.262*** (.055)			-0.093 (.052)	-0.105 (.055)
K-12 SC moderates	0.009	-0.256*** (.054)	0.120 (.051)	0.163** (.052)	-0.091 (.051)	-0.106* (.054)
ES SC moderates	0.010	-0.257*** (.054)	0.003 (.090)	0.176*** (.051)	-0.089 (.051)	-0.105* (.053)
MS SC moderates ⁺⁺	0.009	-0.266*** (.054)	-0.032 (.119)	0.142** (.053)	-0.094 (.051)	-0.111* (.054)
HS SC moderates	0.001	-0.265*** (.055)	0.154 (.084)	0.124* (.053)	-0.098 (.052)	-0.101 (.054)
HS family MACE	3.32e-09	-0.248*** (.053)			-0.092 (.052)	-0.064 (.053)
K-12 SC moderates	0.003	-0.240*** (.053)	0.131 (.051)	0.100* (.049)	-0.094 (.052)	-0.062 (.052)
ES SC moderates	0.004	-0.243*** (.053)	0.003 (.091)	0.107* (.050)	-0.094 (.052)	-0.065 (.052)

⁺ES SC models control for MS & HS, ⁺⁺MS SC models control for ES & HS, ⁺⁺⁺HS SC models control for MS & HS
^{*} $p=0.011-0.05$, ^{**} $p=0.0011-0.01$, ^{***} $p\leq 0.001$

Interaction Between Grade-Specific SC and Specific Types of Maltreatment on SQ Relaxed Ratings

Interfamilial MACE is a composite measure of exposure to eight forms of childhood maltreatment. It is important to ascertain if the potential protective effects of SC are universal or limited to specific types of abuse or neglect. Six types of maltreatment included in the intrafamilial maltreatment score demonstrated a statistically significant relationship with the SQ relaxed scale: non-verbal emotional abuse, verbal abuse, sexual abuse, physical and emotional neglect, and witnessing abuse of a sibling. SC interacted with five of these; interactions with witnessing abuse of a brother or sister were not statistically significant. Due to differences in time dependent relationships, interactions with each form of maltreatment are reported separately (Tables 3.4-3.8)

NVEA. As reported in table 3.4, K-12 school connectedness did not interact with K-12 NVEA, but did moderate NVEA occurring during ES ($\beta=0.121, p=0.019$), MS ($\beta=0.105, p=0.045$), and HS ($\beta=0.125, p=0.014$). ES connectedness interacted with lifetime ($\beta=0.106, p=0.025$), elementary ($\beta=0.153, p=0.002$), middle $\beta=0.132, p=0.010$), and high ($\beta=0.153, p=0.002$), school NVEA. MS connectedness interacted high school NVEA ($\beta=0.109, p=0.04$). HS connectedness did interact with NVEA at any age.

Verbal abuse. As reported in table 3.5, the interaction between K-12 verbal abuse and SC was not statistically significant in elementary, middle or high school. However, interactions occurred at other ages. K-12 SC interacted with verbal abuse in ES ($\beta=0.117, p=0.032$), MS ($\beta=0.153, p=0.006$), and HS ($\beta=0.119, p=0.032$). ES connectedness interacted with verbal abuse occurring in ES ($\beta=0.159, p=0.004$), MS ($\beta=0.177, p=0.001$), and HS ($\beta=0.131, p=0.014$). MS connectedness interacted with concurrent, MS verbal abuse ($\beta=0.132, p=0.018$).

Sexual abuse. As reported in Table 3.6, K-12 sexual abuse interacted with school connectedness in K-12 ($\beta=0.155$, $p=0.007$), MS ($\beta=0.151$, $p=0.008$), and HS ($\beta=0.180$, $p=0.001$). Interactions did not rise to statistical significance when sexual abuse was broken down into grade level. Sexual abuse is the only type of maltreatment that did not interact with ES connectedness.

Table 3.4. Main and interactive effects of non-verbal emotional abuse (NVEA) and school connectedness by grade groupings on SQ relaxed ratings. Values are beta weights (se).

	Coef	NVEA (se)	SC (se)	NVEA*SC (se)	Sex (se)	Parent Ed (se)
NVEA (all ages)	-2.11e-10	-0.158** (.054)			-0.115* (.053)	-0.048 (.054)
ES SC moderates ⁺	0.004	-0.145** (.053)	0.010 (.093)	0.106* (.052)	-0.114* (.052)	-0.046 (.053)
ES NVEA	-2.41e-09	-0.145** (.055)			-0.111* (.053)	-0.052 (.054)
K-12 SC moderates	-0.001	-0.147** (.054)	0.154 (.052)	0.121** (.051)	-0.114* (.052)	-0.054 (.053)
ES SC moderates ⁺	-0.006	-0.143** (.054)	0.039 (.093)	0.153** (.051)	-0.117* (.052)	-0.050 (.053)
MS NVEA	-2.54e-09	-0.212*** (.054)			-0.097 (.053)	-0.062 (.053)
K-12 SC moderates	-0.002	-0.208*** (.053)	0.149 (.052)	0.105* (.052)	-0.098 (.052)	-0.065 (.052)
ES SC moderates	-0.003	-0.207*** (.053)	0.039 (.092)	0.132** (.052)	-0.098 (.052)	-0.061 (.052)
HS NVEA	-4.55e-09	-0.153** (.053)			-0.111* (.053)	-0.034 (.053)
K-12 SC moderates	-0.002	-0.142** (.053)	0.146 (.052)	0.125** (.051)	-0.111* (.052)	-0.294 (.052)
ES SC moderates	-0.001	-0.140** (.053)	0.012 (.092)	0.153** (.051)	-0.110* (.052)	-0.028 (.052)
MS SC moderates ⁺⁺	-0.002	-0.150** (.053)	0.014 (.121)	0.109* (.053)	-0.112* (.052)	-0.032 (.052)

⁺ES SC models control for MS & HS, ⁺⁺MS SC models control for ES & HS, ⁺⁺⁺HS SC models control for MS & HS
^{*} $p=0.011 - 0.05$, ^{**} $p=0.0011 - 0.01$, ^{***} $p \leq 0.001$

Table 3.5. Main and interactive effects of parental verbal abuse (VA) and school connectedness by grade groupings on SQ relaxed ratings. Values are beta weights (se).

	Coef	VA (se)	SC (se)	VA*SC (se)	Sex (se)	Parent Ed (se)
ES VA	-3.80e-09	-0.106* (.054)			-0.130**	-.045 (.053)
K-12 SC moderates	-0.002	-0.120* (.054)	0.147 (.052)	0.117* (.054)	-0.141** (.053)	-0.047 (.053)
ES SC moderates	-0.002	-0.125** (.053)	0.041 (.093)	0.159** (.055)	-0.149** (.053)	-0.047 (.053)
MS VA	5.22e-10	-0.157** (.055)			-0.113* (.053)	-0.060 (.055)
K-12 SC moderates	-0.002	-0.165** (.054)	0.145 (.052)	0.153** (.055)	-0.120* (.052)	-.066 (.054)
ES SC moderates ⁺	0.004	-0.170** (.054)	0.019 (.092)	0.177*** (.053)	-0.121** (.052)	-0.069 (.053)
MS SC moderates ⁺⁺	0.003	-0.176*** (.054)	-0.036 (.122)	0.132** (.055)	-0.120* (.052)	-0.067 (.054)
HS VA	-4.44e-11	-0.129** (.054)			-0.115* (.053)	-0.044 (.054)
K-12 SC moderates	-0.007	-0.160** (.054)	0.151 (.052)	0.119* (.055)	-0.117* (.052)	-0.051 (.053)
ES SC moderates	-0.007	-0.166** (.054)	0.030 (.093)	0.131* (.054)	-0.116* (.052)	-0.055 (.053)

⁺ES SC models control for MS & HS, ⁺⁺MS SC models control for ES & HS
^{*} $p=0.011 - 0.05$, ^{**} $p=0.0011 - 0.01$, ^{***} $p \leq 0.001$

Table 3.6. Main and interactive effects of intrafamilial sexual abuse (SA) and school connectedness by grade groupings on SQ relaxed ratings. Values are beta weights (se).

	Coef	Sex Ab (se)	SC (se)	Sex Ab*SC (se)	Sex (se)	Parent Ed (se)
SA (all ages)	-7.19e-10	-0.112* (.055)			-0.109* (.054)	-0.039 (.054)
K-12 SC moderates	-0.002	-0.135* (.054)	0.146 (.052)	0.162** (.060)	-0.100 (.053)	-0.047 (.053)
MS SC moderates ⁺⁺	9.85e-06	-0.121* (.054)	0.011 (.122)	0.155** (.060)	-0.106* (.053)	-0.048 (.053)
HS SC moderates ⁺⁺⁺	0.000	-0.112* (.054)	0.140 (.086)	0.178*** (.056)	-0.104* (.053)	-0.040 (.053)

⁺⁺MS SC models control for ES & HS, ⁺⁺⁺HS SC models control for MS & HS
^{*} $p=0.011 - 0.05$, ^{**} $p=0.0011 - 0.01$, ^{***} $p \leq 0.001$

Physical and Emotional Neglect. As reported in Table 3.7, K-12 physical neglect interacted with K-12 ($\beta=0.137, p=0.011$) and ES ($\beta=0.154, p=0.005$) connectedness. In addition, K-12 ($\beta=0.147, p=0.005$), ES ($\beta=0.147, p=0.006$), MS ($\beta=0.118, p=0.030$), and HS ($\beta=0.116, p=0.020$) connectedness interacted with physical neglect occurring in HS.

As reported in table 3.8, only emotional neglect occurring in MS interacted with school connectedness. K-12 ($\beta=0.110, p=0.041$) and ES ($\beta=0.123, p=0.030$) connectedness produced statistically significant interactions.

Table 3.7. Main and interactive effects of physical neglect (PN) or emotional neglect (EN) and school connectedness by grade groupings on SQ relaxed ratings. Values are beta weights (se).

	Coef	Sex Ab (se)	SC (se)	Sex Ab*SC (se)	Sex (se)	Parent Ed (se)
PN (all ages)	-7.58e-10	-0.168** (.054)			-0.118* (.053)	-0.054 (.054)
K-12 SC moderates	0.005	-0.161** (.053)	0.135 (.052)	0.137* (.054)	-0.113* (.052)	-0.048 (.053)
ES SC moderates ⁺	0.006	-0.165** (.053)	0.003 (.093)	0.154** (.052)	-0.115* (.052)	-0.052 (.053)
HS PN	1.61e-09	-0.168** (.053)			-0.123* (.053)	-0.042 (.053)
K-12 SC moderates	0.011	-0.139** (.053)	0.130 (.052)	0.147** (.052)	-0.123* (.052)	-.044 (.052)
ES SC moderates ⁺	0.011	-0.138** (.053)	-0.003 (.093)	0.147** (.052)	-0.122* (.052)	-0.050 (.052)
MS SC moderates ⁺⁺	0.008	-0.143** (.053)	-0.005 (.122)	0.118* (.053)	-0.127* (.052)	-0.042 (.052)
HS SC moderates ⁺⁺⁺	0.007	-0.145** (.053)	0.119 (.086)	0.116* (.049)	-0.127* (.052)	-0.034 (.053)

⁺ES SC models control for MS & HS, ⁺⁺MS SC models control for ES & HS, ⁺⁺⁺HS SC models control for MS & HS
* $p=0.011 - 0.05$, ** $p=0.0011 - 0.01$, *** $p \leq 0.001$

Table 3.8. Main and interactive effects of physical neglect (PN) or emotional neglect (EN) and school connectedness by grade groupings on SQ relaxed ratings. Values are beta weights (se).

	Coef	Sex Ab (se)	SC (se)	Sex Ab*SC (se)	Sex (se)	Parent Ed (se)
MS EN	1.38e-09	-0.205*** (.053)			-0.108* (.053)	-0.051 (.053)
K-12 moderates	0.004	-0.195*** (.053)	0.138 (.052)	0.110* (.053)	-0.106* (.052)	-0.055 (.052)
ES SC moderates ⁺	0.003	-0.195*** (.053)	0.017 (.092)	0.123* (.054)	-0.108* (.052)	-0.053 (.052)

*ES SC models control for MS & HS, **MS SC models control for ES & HS, ***HS SC models control for MS & HS

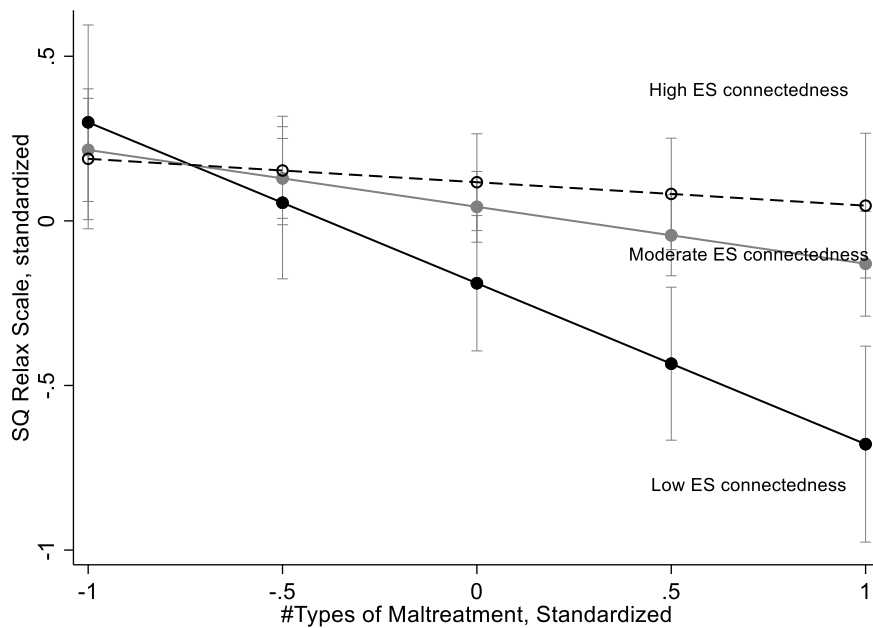
* $p=0.011 - 0.05$, ** $p=0.0011 - 0.01$, *** $p \leq 0.001$

The Influence of Elementary School Connectedness

ES connectedness moderated the relationship between SQ relaxed and lifetime intrafamilial MACE as well as MACE during elementary, middle and high school. It also moderated the effects of NVEA, verbal abuse, physical neglect and emotional neglect. In 12 cases, ES connectedness moderated the relationship between SQ relaxed and future or lifetime maltreatment, and in almost every instance connectedness in the early grades appeared to be a more significant moderator than K-12, middle or high school connectedness. However, ES connectedness did not alter the predictive relationship between sex abuse and SQ relaxed at any age. Figure 3.2 illustrates the differences in slope for ratings of SQ relaxed and two measures of lifetime childhood adversity conditioned on prototypical values of 5th (low), 50th (mid) and 95th (high) percentile levels of ES connectedness. Figure 3.3 illustrates differences in slope for the relationship between SQ relaxed and two types of maltreatment occurring in ES for various prototypic levels of connectedness. Figure 3.4 illustrates the interactive influence of ES SC on the relationship between maltreatment reported to have occurred during secondary school and SQ relaxed scores.

Figure 3.2. Linear interaction between A. Lifetime Family MACE and B. Lifetime Physical Neglect and Prototypical Values (5th (low), 50th (mid) and 95th (high) percentile) of Elementary School Connectedness on SQ Relax Score with 95% confidence intervals.

A. Lifetime Family MACE



B. Lifetime Physical Neglect

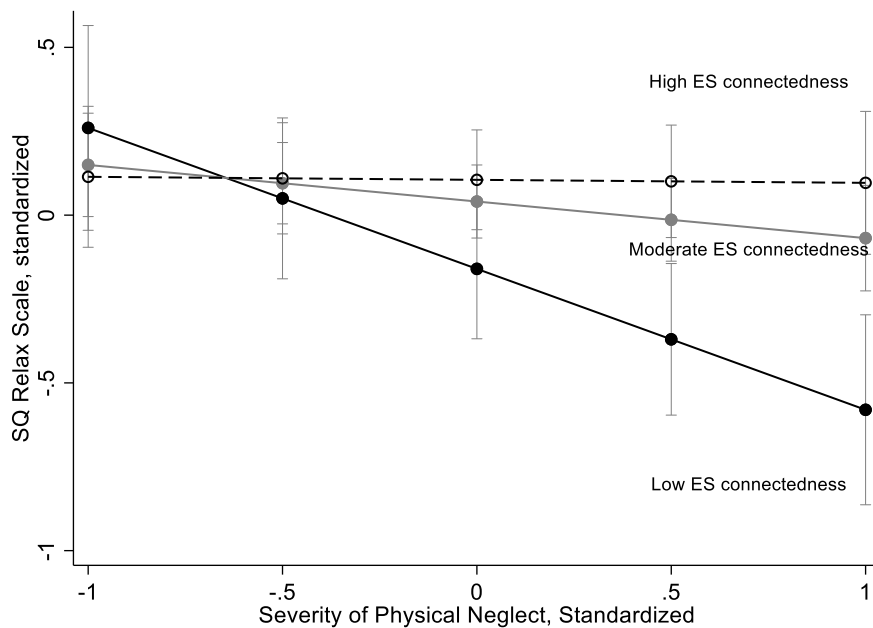
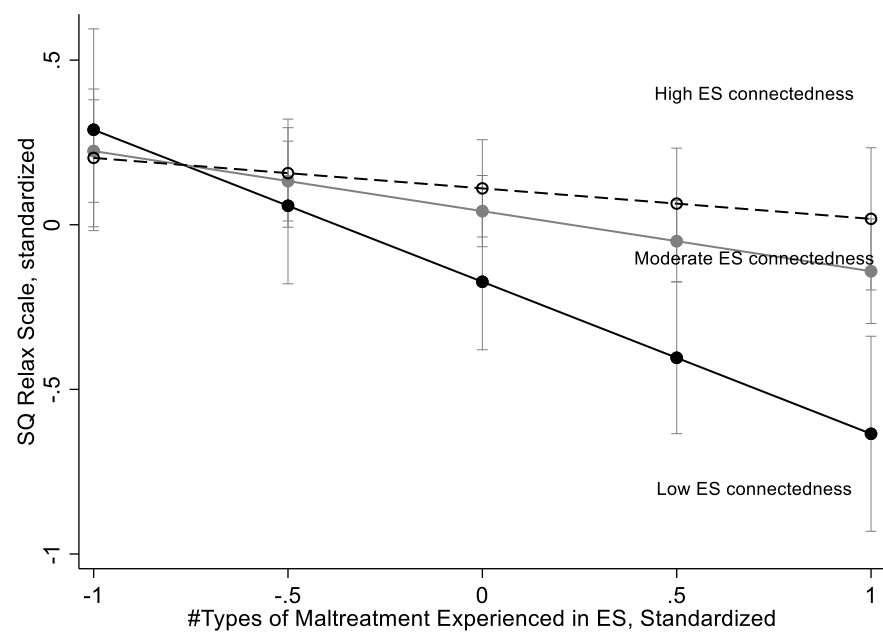


Figure 3.3. Linear interaction between A. ES MACE and B. ES Verbal Abuse and Prototypical Values (5th (low), 50th (mid) and 95th (high) percentile) of Elementary School Connectedness on SQ Relax Scores with 95% confidence intervals.

A. Family MACE Occurring During Elementary School



B. Verbal Abuse Occurring During Elementary School

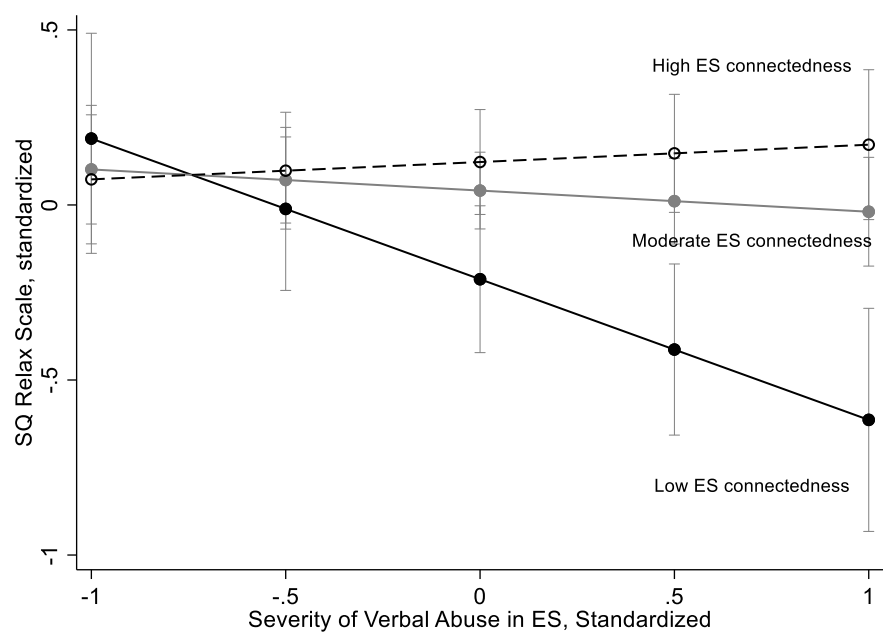
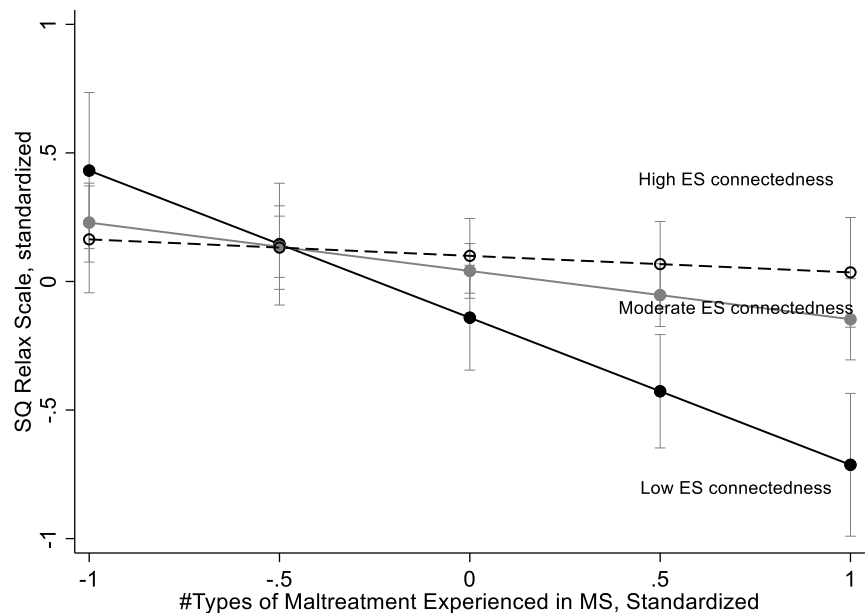
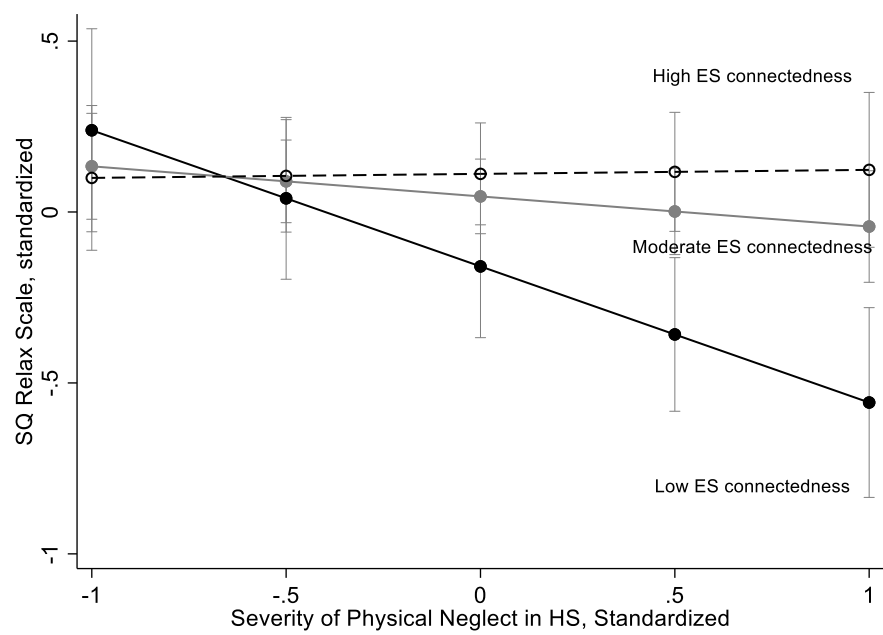


Figure 3.4. Linear interaction between A. MS Family MACE and B. HS Physical Neglect and Prototypical Values (5th (low), 50th (mid) and 95th (high) percentile) of Elementary School Connectedness on SQ Relax Scores with 95% confidence intervals.

A. Family MACE Occurring During Middle School



B. Physical Neglect Occurring During High School



Temporal Interrelationships Between Maltreatment and School Connectedness

School connectedness moderates the relationship between future episodes of maltreatment and SQ relaxed scores. Multiple instances were observed in which SC in ES or MS interacted with exposure to family MACE or specific types of maltreatment at later ages. For example, ES connectedness moderated the relationship between family MACE occurring in middle and high school and current measures of anxiety. Similarly, school connectedness occurring in ES moderated the relationship between NVEA and verbal abuse occurring during MS and HS, as well as emotional neglect during the middle grades and physical neglect in HS. MS connectedness moderated the relationship between NVEA and physical neglect occurring in HS. These observations are consistent with the idea that SC may protect against some of the consequences of future exposure to maltreatment, a process described by some as ‘inoculation’.

School connectedness moderates the relationship between concurrent episodes of maltreatment and SQ relaxed scores. ES, MS and HS SC each significantly interacted with exposure to various types of maltreatment at the same age to attenuate effects on SQ relaxed ratings. Specifically, ES connectedness moderated the influence of ES family MACE, ES NVEA, and ES verbal abuse. MS connectedness moderated the effects of MS family MACE and MS verbal abuse. And HS connectedness moderated the relationship between HS family MACE and HS physical neglect on SQ relaxed ratings. Attenuating the consequence of concurrent exposure to adversity has been described as a ‘buffering’ effect.

School connectedness moderates the relationship between past episodes of maltreatment and SQ relaxed scores. Evidence for an interactive effect of SC at one

age and maltreatment at an earlier age was limited to the moderating influence of HS connectedness on MS family MACE. This type of interaction may be classified as a ‘rescuing’ effect.

Preliminary Evidence for Inoculating, Buffering, and Rescue Effects

MS intrafamilial maltreatment was moderated by ES, MS and HS connectedness, offering a unique opportunity to evaluate time dependence. As indicated in Table 3.9, ES connectedness remained statistically significant after controlling for MS and HS connectedness ($\beta_{\text{MACE*ES_SC}}=0.288, p=0.001$), indicating inoculating effects. MS connectedness also remained statistically significant after controlling for ES and HS connectedness ($\beta_{\text{MACE*MS_SC}}=0.230, p=0.008$), providing evidence of a buffering effect. Finally, moderation by HS connectedness also proved robust after controlling for ES and MS connectedness ($\beta_{\text{MACE*HS_SC}}=0.196, p=0.020$), indicating rescue effects. While not definitive, this combination provides preliminary evidence that school connectedness, when measured and applied in a time dependent manner, may offer a full range of protectiveness

Table 3.9. Evidence that school connectedness acts as inoculant, buffer and rescue factor in the stress relationship between intrafamilial maltreatment occurring in middle school and the SQ relaxed scale.

	Coef	MACE (se)	MACE*SC (se)	SC (se)	Sex (se)	Parent Ed (se)
MS Family MACE						
ES SC Moderates ⁺	0.010	-0.257*** (.054)	0.176*** (.051)	0.003 (.090)	-0.089 (.051)	-0.105* (.053)
MS SC Moderates ⁺⁺	0.009	-0.266*** (.055)	0.142** (.053)	-0.032 (.119)	-0.094 (.051)	-0.111* (.054)
HS SC Moderates ⁺⁺⁺	0.001	-0.265*** (.055)	0.124** (.053)	0.154 (.084)	-0.098 (.052)	-0.010 (.054)

⁺ES SC models control for MS & HS, ⁺⁺MS SC models control for ES & HS, ⁺⁺⁺HS SC models control for MS & HS

* $p=0.011 - 0.05$, ** $p=0.0011 - 0.01$, *** $p \leq 0.001$

Discussion

Technological advances allowing improved study of neurobiological development, epigenetics and other biological systems have transformed understanding of the effects of childhood maltreatment on the life course. However, research into school connectedness integrating the effects of childhood abuse and neglect on health and safety outcomes is rare. This study examined whether school connectedness, as measured by the five-indicator measurement model developed in study 1, moderates the relationship between several types of childhood maltreatment and mental well-being in early adulthood and if so, whether the relationships are time dependent.

Consistent with hypothesis one, that SC would act as a protective factor moderating the effects of maltreatment on mental well-being, the study found risk x SC interaction in several relationships between maltreatment and the relaxed subscale, the well-being measure associated with anxiety (Kellner, 1987). SC moderated the linear relationship between intrafamilial maltreatment as well as non-verbal emotional abuse, verbal abuse, sexual abuse, physical neglect and emotional neglect and the relaxed subscale. It is somewhat unexpected that interactions were statistically significant only in relationships between maltreatment and the well-being subscale associated with anxiety. However, prior research has not examined the relationship between anger/hostility or somatic symptoms and SC, so it is not surprising that the well-being measures associated with these forms of mental distress did not yield statistically significant results in this study. The finding that the contented subscale, associated with depression, was not moderated by SC is unexpected as a number of studies have found an inverse relationship between SC in adolescence and depressive symptoms (Arango et al., 2010; CDC, 2009;

Joyce et al., 2014; Langille et al., 2015; Lester et al., 2013; McNeely et al., 2002; Resnick, 1997). It is possible that depression driven by childhood maltreatment was masked in these linear regressions or that this type of depression is more impervious to the protective effects of SC.

Consistent with hypothesis two, that when examined by elementary, middle and high school, SC would provide protection against concurrent maltreatment., there were a number of cases of contemporaneous moderation. Specifically, K-12 SC interacted with family MACE, K-12 sexual abuse, and K-12 physical neglect; ES connectedness interacted with same age family MACE, non-verbal emotional abuse, and physical neglect; MS connectedness interacted with MS family MACE and verbal abuse; and HS connectedness buffered HS family MACE. Rather unexpectedly, there were instances of time-dependent moderation of maltreatment. For example, ES connectedness interacted with MS verbal abuse, MS connectedness interacted with HS non-verbal emotional abuse, and HS connectedness interacted with MS family MACE and relaxed. Along with concurrent moderation, elementary school connectedness demonstrated protective effects in the face of long-term maltreatment, such as family MACE (ages 1-18), K-12 non-verbal emotional abuse, and K-12 verbal abuse as well as a number of future adversities, including middle and high school family MACE, non-verbal emotional abuse and verbal abuse, middle school emotional neglect and high school physical neglect.

In theory, a protective factor can offer protection against current, future, and past adversity. Although well documented in animal studies (Lyons & Parker, 2007; Lyons et al., 2009; Schrijver et al., 2004), these latter forms of protection are exceedingly rare in human studies. Therefore, the finding that SC protected against a range of future

adversities and a few instances of past harm was surprising. Because ES connectedness is consistently absent from the literature its robustness is particularly unexpected, but not inconsistent with the existing frameworks regarding protective factors.

Social Ecology Framework

Social ecology theory posits that the physical and social ecology are essential to potentiating positive development and growth in the face of adversity or stress (Ungar, 2012). The social ecology framework is rooted in Bronfenbrenner's (1979) description of interaction with and between systems in the environment, as well as researchers Rutter (1987) and others, who have identified the importance of environment. The ecological approach identifies the environment as the "locus of resources" for positive coping and growth in the face of adversity (Ungar, 2012, p. 15). In this framework, school connectedness may be viewed as the social ecology as experienced by individuals. High levels of SC should reflect both goodness of fit with the environment as well as access to needed resources. For example, a child experiencing verbal or non-verbal emotional abuse at home is unlikely to be receiving needed praise in that environment, and thus the praise of both effort and accomplishment at school is a resource for growth and coping. Potentiating positive growth in the early years of school would position the student differently in relation to subsequent school contexts, such as middle school, thereby helping to explain the protective effects of elementary school in the face of later maltreatment.

Competence

Competence refers to positive adaptation in the face of stress (Matsen et al., 1990), across a range of domains, including academic, social and emotional skills

(Obradović et al., 2010). Derived from the field of developmental psychopathology, positive adaptation in the face of adversity is viewed as an alternate trajectory to psychopathology (Masten et al., 1990). More recent research suggests cascading effects across time and domains (Cox et al., 2010; Masten & Cicchetti, 2010; Obradović et al., 2010). Given the interrelatedness among domains, “competence begets competence” (Masten, 2014, p.293). Success in key developmental tasks has two effects; on the one hand mastery prepares young people for the next tasks, increasing likelihood of success; at the same time, success also reduces the likelihood of future problems (Masten et al., 2004). To the extent that school connectedness represents positive adaptation to school, early competence would be expected to cascade in positive ways into other domains, including psychosocial well-being. Confirmation of developmental cascades requires three time points in three domains (Moilanen et al., 2010). Future research to enrich understanding of SC in this framework is certainly warranted.

Attachment

Attachment theory posits that children require a safe, predictable and affectionate bond with a reliable caregiver (Bowlby, 2007). Absent secure attachment, or in the face of an attachment relationship disrupted by maltreatment, children are at risk of deficits in cognitive, behavioral, and emotional regulation (Cook et al., 2005). Gene by environment interaction creates the context for an iterative opportunity for attachment: early in life babies demand attention to their needs by crying, a function of genetic programming, and over time caregivers’ response causes a more complex or nuanced set of behaviors to emerge. Now more complex, the child will enter into novel environments prepared for a next iteration of attachment (Cox et al., 2010). If the psychological needs associated with

attachment, connection, regulation, and psychological autonomy in a subsequent environment, are met attachment may yet emerge Barber and Olsen (1997). Social development theory posits that bonding can be intentionally fostered through a four-step process of opportunity, skill building, engagement, and reinforcement (Catalano & Hawkins, 1996). Consistent with developmental cascades, attachment builds on itself over time through a series of adaptations that reflect the interaction between the child, the previous experience that has shaped them, and the environment (Sroufe, Carlson, Levy and Egeland, 1999). In the past, the association between SC and health outcomes has been explained by attachment and social development theory (Bond, 2007). It is plausible that elementary school connectedness is powerful because its elements foster attachment which then builds on itself over time. Future research regarding attachment is warranted.

Limitations and Implications

Like all studies, this one has limitations. Chief among these are the use of self-reported, retrospective data which may be subject to bias, inaccurate memory or nostalgia. Unless a clinical sample is used, self-reporting of maltreatment is common, due to the challenges that educators, psychologists, and medical doctors face as mandatory reporters of child abuse and neglect. A number of methods have been developed to triangulate self-report, including comparison to prevalence rates. Test-retest of the MACE tool produced very good reliability (Teicher and Parigger, 2015). On the other hand, retrospective self-report of school connectedness is new. The emergence of longitudinal invariance does suggest internal consistency within the self-reports. School connectedness is meant to capture a feeling of belonging or support (Arango et al., 2018), and reflects student beliefs about adult attitudes (CDC, 2009), which would be difficult to

document in other ways. Further, Skinner and Belmont (1993) found important validation for student perception as early teacher perception of engagement determined the distribution of teacher aid and support in the classroom. Student perception of support shaped belonging and engagement over time, suggesting that self-report has value in this instance.

The introduction of a retrospective measure of school connectedness opens the possibility of pairing retrospective research on risk factors with inquiry regarding protective factors to round out our understanding of developmental trajectory and outcomes over the lifespan. It will be important to examine whether the power of elementary school connectedness as a protective factor endures. The findings with respect to timing of protection has implications for the effective distribution of prevention resource as well.

Chapter Four:

Implications for Practice

Although cases of severe physical abuse reported to CPS have been declining in the United States the last several years, the number of substantiated cases of child maltreatment still approaches 700,000 (USHHS, 2020), and the evidence suggests that the majority of cases go unreported (Gilbert, 2012; NCANTP, 2013). In addition, the child protection system is not charged with addressing some forms of maltreatment known to cause developmental harm, such as verbal abuse or witnessing domestic violence. So, while often invisible to educators, children continue to bring trauma, developmental deficits, and risk for poor outcomes to school with them. A portion of maltreated students do experience school as a haven from home (Masten, 2014), and at the same time, abused and neglected children tend to fare worse than their non-maltreated peers on grades (Kinard, 2001; Kurtz et al., 1993), test scores (Kinard, 2001; Kurtz et al., 1993), exclusionary discipline (Cicchetti & Toth, 1995; Eckenrode et al., 1993), and peer relations (Lynch & Cicchetti, 1997).

Lifetime depression (Dube et al., 2003; Teicher et al., 2003), anxiety (Dong, Anda, et al., 2003; Edwards et al., 2003; Teicher et al., 2003), and substance abuse (Dube, Felitti et al., 2003; Felitti et al., 1998) are strongly associated with maltreatment. Beginning in the 1980s, researchers in a variety of fields found inverse associations between these outcomes and school connectedness (CDC, 2009). But few, if any, studies have gone so far as to test whether school connectedness interacts with child

maltreatment to create a buffering effect. One reason for this gap in the literature is practical barriers to measurement. On the one hand, school connectedness has been investigated using real-time assessment with 10- to 18-year-olds. On the other hand, research with minors regarding child maltreatment is limited due to the mandatory reporting responsibilities of many investigators. Research with minors regarding maltreatment has typically been done in real time with children referred to CPS or retrospectively with young adults. The aim of this research was to develop a retrospective measure of school connectedness (study 1) and to evaluate school connectedness as a time-dependent protective factor (study 2).

Study 1 produced measurement models for elementary school, middle school, high school and grades K-12, using the same five indicators at all grade levels. The models demonstrated strong longitudinal invariance, suggesting that the relationship between the factor and the indicator variables is similar across these stages of development. In addition, the factors have excellent reliability, with McDonald omegas in excess of 0.82. The model comports with the literature, conferring content validity. The indicators are: motivated to learn, adults praised effort and accomplishment, adults modeled scholarship and learning, sought help when needed from a trusted adult, and warm relationship with peers.

In study 2, school connectedness interacted with several forms of maltreatment to alter the relationship between that risk factor and mental well-being at ages 18 to 25. The forms of maltreatment buffered include: the aggregate measure of eight types of maltreatment known as the family MACE score, non-verbal emotional abuse, verbal abuse, sexual abuse, physical neglect and emotional neglect. These results were time

dependent. Elementary school connectedness proved to be the most powerful protective factor, conferring a buffer against contemporaneous as well as future maltreatment in a number of cases. Middle school and high school connectedness protected against current maltreatment, and in a small number of cases, against past maltreatment. Consistent with Polcari and colleagues' (2014) findings on parental verbal aggression and affection, school connectedness buffered well-being, not depression or anxiety.

Context for practice decisions

Fostering school connectedness is good for all students, and is protective for those facing particular risks. Decades of research demonstrate inverse linear relationships between school connectedness and a variety of outcomes when all students are included in sampling (CDC, 2009). As an example, Resnick (1997) found a negative association between SC and suicidal ideation in middle school. While it is possible that lack of connection to school causes a portion of suicidal behavior, population studies suggest that maltreatment explains the greatest fraction of risk (Dube, Anda, et al., 2001). Taken together, these two strands of research suggest that developing school connectedness should be a matter of practice, and not an intervention reserved for children who have been screened for risk. However, when students' risks are known, there is wisdom in making an effort to cultivate demonstrated protective factors, such as school connectedness, as mental well-being declines far more precipitously for those with low school connectedness than for those with high school connectedness in the face of maltreatment.

The time-dependent effects in study two indicate that elementary school connectedness is particularly powerful. While there is little applied research to illuminate

these findings, there are many theoretical explanations that are consistent with early action to foster connectedness. For example, Finn (1989), described connectedness, or school identification, as a developmental process that begins upon contact with school. Developmental psychopathologists argue that positive adjustment to school is the function of competence, and “competence begets competence” (Masten, 2014, p. 293). Developmental cascades theory suggests that upstream development, whether resulting in deficits or competencies, shapes the developmental trajectory by determining what resources the individual carries with them into novel contexts and domains, and often which domains will be activated in developmental processes (Cox et al., 2010; Moilanen et al., 2010; Obradović et al., 2009). For maltreated children in particular, deficits in attachment have cascading effects on the capacity for cognitive, emotional and behavioral self-regulation, especially under stress (Cook et al., 2005). Interventions aimed at improving health outcomes via attachment or bonding to school produce greater effect sizes when delivered earlier (Hawkins, Guo et al., 2001).

Implications of school connectedness indicators for practice

Motivation. Consistent with Goodenow and Grady (1993), who argue that school connectedness causes motivation, “motivated to learn” emerged as one of five indicators of school connectedness in study one, with myriad implications for practice. In longitudinal observational studies, Skinner and Belmont (1993) found a tendency among teachers to provide teacher support, including positive relationship building, help with task, and autonomy in learning activities, to students who presented with engaged affect at the beginning of the term. Students perceived as disengaged due to affect, anxiety or boredom, did not receive this type of teacher support. Compared to peers, maltreated

students struggle with affect (Cook et al., 2005), social relationships (Rogosch & Cicchetti, 1994; Sansen et al, 2014), and attention to task (Cook et al, 2005). Both teacher behaviors created re-enforcing loops: supported students grew more motivated over time and unsupported students grew less motivated over time, with student motivation driving the future allocation of instructor resource. This suggests that teachers need to make conscious efforts to reach out to disengaged students and scaffold participation over time. Small group work and active learning strategies like improvisation and role play, may help to increase motivation (Bond et al., 2007).

Praise for effort and accomplishment. Praise for effort *and* accomplishment are central to “growth mindset,” student perception of their abilities (Dweck, 2015); defaulting to one or the other is unhelpful (Dweck, 2016). Praise concretely linking what a student has attempted with outcome goals increases motivation differentially, with the greatest gains accruing to students who have the lowest grades and those in under-resourced schools (Yeager et al., 2019). This type of praise can take many forms. But when students are struggling or challenged by a problem, identifying what has been attempted and supporting next steps is a helpful approach (Dweck, 2015). Challenges, criticism and doing poorly compared to peers can trigger insecurity and defensiveness (Dweck, 2016); therefore, it is important for educators to respond to mistakes as learning opportunities not as something harmful, shameful or terrible (Dweck, 2015). But because this type of stress can easily result in disorganized cognition, behavior and emotion for maltreated children (Cook et al., 2005), framing mistakes as evidence of effort, sources of learning, and insight into growing mastery is particularly important. As a practical matter,

teachers may need compassion strategies for calming and reorganizing cognition, behavior, and emotion in the face of student distress.

Adults model scholarship and learning. One approach to modeling learning is adopting a growth mindset, openly responding to student questions by saying, “I don’t know. How might we find out together?” or “I haven’t mastered that--yet” (Dweck, 2015). Modeling learning in these ways may infuse a sense of equality and respect into the student-teacher relationship. Making both teacher and student learning visible has many positive effects for students; among these, visible learning supports the process of becoming one’s own teacher, a critical component of self-regulation (Hattie, 2012). While all children benefit from deeper learning, maltreated students may struggle with deficits in self-regulation, suggesting that educators pursue these instructional moves.

Seek help from trusted adult when needed. While teachers cannot control whether students engage in help seeking, schools can often provide or refer students to supports they need. Ungar (2018) argues that helping young people navigate available resources in order to get their needs met is essential to resilience; therefore, when it comes to issues of personal help, educators need to be familiar with available resources as well as referral strategies (Cole, 2005).

In the classroom, maltreated children have difficulty with help seeking, tending either towards refusing help or exhibiting over-dependence (Bergin & Bergin, 2009; Birch & Ladd, 1997). Pedagogies such as productive struggle (Warshauer, 2015) offer teachers a continuum of responses to requests for help with tasks: telling response, which specifies a next step; directed guidance, where the teacher asks questions to illuminate what has been tried and what next steps might logically follow; probing guidance, which

makes student thinking visible; and affordance, which is particularly useful when students are stuck in getting started. Here, the teacher responds to student uncertainty with questions and think time (Warshauer, 2015). Implementing such strategies can help all students learn more deeply, and support maltreated children in fostering appropriate levels of autonomy and help-seeking.

Warm peer relations. While relationships among peers may be viewed as a student matter, facilitating positive relationship has important classroom implications. Bollen and Hoyle (1990) note: “If individuals do not perceive themselves to be members of a group, it is difficult to understand how group norms, values and other characteristics are likely to affect them” (p. 484). Maltreated children are at elevated risk for difficulty with peers, including peer victimization (Sansen et al., 2014). Intentionally shaping school climate (CDC, 2009) and interrupting peer victimization (Englander, 2013; Sansen et al., 2014) are essential to student well-being. When asked, students reported that teachers should help them make friends and navigate friendships (Bouchard & Berg, 2017; Gowing & Jackson, 2016). Promoting social competence, for example through the Interpersonal Cognitive Problem-Solving curriculum (Shure, 2001), has been integral to interventions to improve bonding to school (Hawkins, Guo et al., 2001).

Policy Implications in the Context of Coronavirus School Closures (Spring, 2020)

At the time of this writing, schools in 48 US states, the district of Columbia, four US territories, and the Department of Defense education system are closed, leaving nearly 51 million students out of class (Education Week, 2020). Most systems will not reopen until the fall (Nextstar Media, 2020). Local implementation of shutdown orders has produced mixed results when it comes to student and family connectedness to school.

For example, in some school districts, existing personnel are delivering on-line instruction or class meetings. Others are relying on independent online platforms such as Khan Academy (Turner et al., 2020) or foregoing instruction altogether (Rodgers, 2020). The Superintendent of Marple Newtown, Pennsylvania Schools explains that instruction “is not possible, as we cannot ensure equal accesses to resources, educational technology, internet access, equipment, delivery of IDEA, etc.” (Rodgers, 2020).

Schools deliver a range of services beyond instruction, such as developmental therapies (for example, speech, physical and occupational therapy), free and reduced cost breakfast and lunch, and counseling services. These services are also impacted in ways that may disrupt established or potential connectedness. For example, similar to other districts, Columbia, Missouri Public Schools is delivering “grab and go” breakfast and lunch at 80 sites throughout the catchment area (McKinney, 2020) while other districts have replaced school-based meals with expansion of public assistance. Using the Families First Coronavirus Act, Michigan added value to electronic SNAP (formerly food stamps) benefits to cover the cost of meals once received at school. Other states are expected to follow (Spelbring, 2020). In Minnesota, schools have moved counseling services on-line, creating virtual calming rooms and posting mindfulness strategies each week. School personnel schedule one-on-one meetings for emotional support, college guidance and graduation progress monitoring via email. A recent survey found that 60 percent of students who used these services once have continued to do so (Klecker, 2020). But what of the other 40 percent?

Based on U.S. Census data, the Associated Press estimates that 3 million U.S. students do not have internet at home, with 17 percent of students lacking a device and 18

percent lacking an internet connection (Melia et al., 2019). Detroit Public Schools estimates that half of their students lack either devices or connections, Baltimore City Schools reports that a quarter of students have no device, and rural districts across the country indicate that there is no internet service in all or portions of their jurisdictions (Turner et al., 2020). This digital divide has profound implications for school connectedness as the most vulnerable students are being left academically behind.

At the same time, exposure to maltreatment appears to be increasing during the lockdown. Analysis of calls to police in five U.S. cities by *The Economist* indicates a five percent increase in domestic violence; however, domestic violence is typically under-reported and calls to shelters indicate a far greater increase (The Economist, 2020). Calls by minors to the Rape, Abuse, and Incest National Network [RAINN] to report sexual abuse increased by 22 percent in the first month of the lockdown; nearly 80 percent of callers reported living with the abuser (Kamenetz, 2020). While the CPS system continues to operate, data regarding non-sexual abuse are not currently available. Typically, education personnel account for over 20 percent of referrals to CPS (HHS, 2018), and historically, CPS reporting is at its lowest when students are out of school for summer vacation (see for example Florida DCF, 2018). Experts suggest that during this time of invisibility, abuse is likely to grow in frequency and severity (Kamenetz, 2020).

As a consequence of coronavirus school closures and stay-at-home orders, at least a segment of students is less connected to school than in the past. This includes: students in jurisdictions with no instruction, young people without devices or internet connections unable to connect to schooling, students who have insufficient devices or bandwidth to connect when siblings and parents also need to use the internet, special education

students who are not receiving services, and children whose parents are unwilling or unable to function as educators at home. Lack of connection to school places all students at risk of dropping out (Finn, 1989), but maltreated children face especial risk due to their adjustment difficulties. Further, loss of connection means loss of protection. The protective buffer afforded by SC will be even more needed as maltreatment becomes both more frequent and less visible.

As part of planning for re-opening, education systems must attend to school connectedness. Because students will transition from elementary to middle school and middle to high school without usual rituals and scaffolds, districts need to step in to set standards and offer resources. Districts ought to assess their local digital divide and prioritize academic catch-up for affected students in a non-punitive way, for example by offering high quality, project-based after school or Saturday school programming. Every district should have a clear plan, and resources to implement it, to find all students who appear not to return to school after the pandemic. Finally, leadership should support and empower teachers to engage in pro-connectedness pedagogies, and require that building administrators promote positive climate.

Implications for research

These studies raise questions that require an interdisciplinary, integrative approach. There is a great deal of existing evidence that a portion of maltreated children have difficulty with adjustment, resulting in greater academic, social, and disciplinary problems than non-maltreated peers. For example, maltreated children are more likely to be referred to an administrator for discipline and more likely to be suspended from school than others (Cicchetti & Toth, 1995; Eckenrode et al., 1993). Separately, using the large

and nationally representative Add-Health dataset, McNeely and colleagues (2002) found that suspension for low-level offenses eroded school connectedness. This invites research that examines typical responses to poor adjustment for their effects not only on school connectedness, but on the capacity of school connectedness to buffer maltreatment at different grade levels.

At the same time, there are strategies at work in schools that likely bolster connectedness and protection. Both the Seattle Social Development Project (Hawkins, Guo et al., 2001) and the Gatehouse Project (Bond et al., 2007) have improved bonding to school and health behavior outcomes by focusing on classroom management and pedagogical practices. It may be helpful to look at those approaches in other settings, and more broadly, at innovative practices in education that are likely to be reaching maltreated children struggling with adjustment. For example, some schools work towards full inclusion of students with disabilities rather than segregated special education (Hehir, 2012). Universal design for learning (Meyer et al., 2002), conscious discipline (Bailey, 2001), neuro-sequential modeling (Perry & Dobson, 2013), and trauma-informed schools (Osher, 2018) and other strategies that support inclusion should be evaluated for their effects on school connectedness, particularly for maltreated children.

Conclusion

School, and adjustment to school, is more than a developmental task. Once schooling begins, children spend at least as many waking hours a day with teachers and peers as they do with parents. It is a context that may offer maltreated children a next iteration of attachment and self-regulation, as well as the opportunity to develop the

competencies demanded by society. A sense of belonging in that place also protects mental well-being in the face of many forms of childhood maltreatment and abuse.

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