A Pathway to Academic Resilience for Students Who Experience Trauma: A Structural Equation Modeling Approach

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Introduction

Trauma was once considered an abnormal experience. Now we live in an era in which many individuals and families are exposed to traumatic life events (American Psychological Association, 2008). Traumatic life event(s) can be a one-time event to reoccurring events experienced by an individual that many times has long-term negative effects on the individual's physical, social, emotional, or spiritual well-being (Substance Abuse and Mental Health Services Administration [SAMHSA], 2012). Department of Health and Human Services (2014) reported that trauma affects people of every race, ethnicity, age, sexual orientation, gender, psychosocial background, and geographic region. Traumas can affect individuals, families, groups, communities, specific cultures, and generations and frequently produce a sense of fear, vulnerability, and helplessness (Najavits & Cottler, 2014).

Commonly recognized traumatic experiences include: emotional abuse, physical abuse, sexual abuse, physical neglect, emotional neglect, mother treated violently, substance abuse in the household, mental illness in the household, parental separation or divorce, and an incarcerated household member (SAMHSA, 2017). Adolescents who experience traumatic events tend to be more at negative risks, exposed to mental distress, likely to engage in risky behaviors and substance use, and have poor academic achievement (Anda, 2002; CDCP, 2016; Masten & Cicchetti, 2016; Narayan et al., 2017; Rew & Horner, 2003; Rothman, Edwards, Heeren, & Hingson, 2008; Stiffman, Hadley-Ives, Elze, Johnson, & Dore, 1999; Strine et al., 2012).

Although the findings on adolescents with traumatic experiences are grim, many survive through improving their adaptive function, manifesting resilience in the aftermath of traumatic experiences. Resilience in general is defined as the ability to bounce back when faced with adversity. Researchers have used a variety of criteria to define and measure resilience in general (Masten & Cicchetti, 2016). Resilience in an individual is inferred from two fundamental judgements: the person must be, or have been, challenged by exposure to significant risk or adversity and must be "doing ok" – i.e., functioning well in spite of exposures to adversity or risk (Fonagy, Steele, Steele, Higgitt, & Target, 1994; Masten, 2015; Motti-Stefanidi & Masten, 2017). Resilience refers to the capacity for adaptation to challenges that threaten the function or

development of a dynamic system, manifested in pathways and patterns of positive adaptation during or following exposure to significant risk or adversity (Masten, 2015; Motti-Stefanidi & Masten, 2017). In the absence of risk or adversity, positive adaptation is not considered an expression of resilience but rather of competence.

Adolescent resilience has been investigated across different adversities, emphasizing different risk and protective factors, and different outcomes (Olsson, Bond, Burns, Vella-Brodrick, & Sawyer, 2003). More recently, resilience has been conceptualized as a dynamic process involving an interaction between both risk and protective processes, that act to modify the effects of an adverse life event (Rutter, 1985, 1999). Consequently, the goal of resilience research is not only to identify who is well-adapted in spite of adversity, but to identify the processes that explain how positive adaptation was achieved. Rutter (1987) has also argued that resilience be understood in terms of processes rather than just identifying static factors.

A specific branch of resilience is academic resilience. Academic resilience is to be able to attain a high level of educational achievement despite experiencing trauma (Martin & Marsh, 2006). An academic resilience scale developed by Cassidy (2016) showed students with academic resilience have limited negative behaviors and adaptive behavioral responses to adversity. Moreover, family support positively contributed to the student's academic resilience (Cappella & Weinstein, 2001; Martin & Marsh, 2009).

This study investigates protective mechanisms important in the process of students' successful adaptation and the mediational effect of risk factor in the mechanisms. The resilience framework is presented in Figure 1 and the included constructs and measures are described below. Researchers argue that adolescents' level of skills and supports, substance use, risky behaviors such as bullying other students, and academic achievement are interrelated components in resilience progresses (Garmezy & Masten, 1991; Kumpfer, 2002; Rew & Horner, 2003; Stewart, Reid & Mangham, 1997).

The suggested framework also includes a critical risk factor, which is mental distress. Risk factors increase the child's susceptibility to negative developmental and health outcomes (Engle, Castle, & Menon, 1996). People with traumatic experience in their childhood tended to report higher level of mental distress and impairment (Maunder, Peladeau, Savage, & Lancee, 2010; Solberg, Carlstrom, Howard, & Jones, 2007). According to Kumpfer (2002), "the stimulus in any resiliency situation should be some type of stressor or challenge, because by definition,

resilience can only be demonstrated when the person experiences some type of stressor or challenge" (p. 189). Previous literature explains that existing stressors or distressing emotion can help a person facing with new stressors and to grow from the experience (Kumpfer, 2002; Olsson et al., 2003) and this is the essence of resilience. In this study, we consider students' mental distress as a positive incoming stimulus that activates the resilience process. We argue that risk factors such as mental distress and protective factors interact to shape students' risky behaviors and associated academic outcomes.
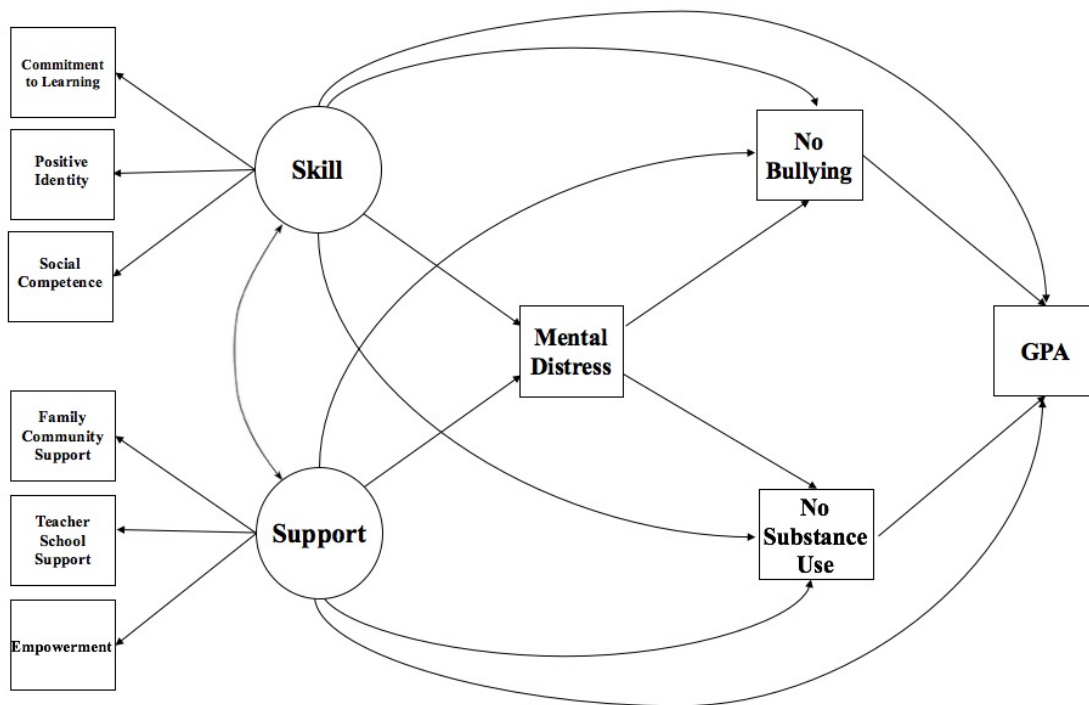

Figure 1. Conceptual model.

We hypothesize that students' mental distress weakens the associations among developmental skills/supports and substance use and risky behaviors avoidance; and that students with mental distress who potentially can be identified as resilient students will have higher academic performance (i.e., higher self-reported grade).

Research Questions

1. Are the associations between positive developmental skills and supports and substance use/bullying behaviors avoidance mediated by students' mental distress?

2. To what extent do direct and indirect associations predict students' academic performance?

Methods

Procedure and Instrument

This study involves secondary data analysis of the 2016 MSS database (Minnesota Department of Education, 2016). The survey was designed by an interagency team from the Departments of Education, Health and Human Services, Public Safety, and Corrections to monitor important trends and support planning efforts of the collaborating state agencies and local public school districts, as well as youth serving agencies and organizations.

Participants

The 2016 MSS was administered to over 168,733 students in grades 5, 8, 9, and 11. Public school student participation was voluntary and surveys were anonymous. Here, only 8th, 9th and 11th grade students were included since some survey items of interest were asked only of these students.

Students with at least one traumatic experience. The sample was further restricted to a group of students who had at least one traumatic experience, including 45,296 students (35.7% of the sample). Items from the MSS indicating traumatic experiences are used to identify students with at least one traumatic experience, including being homeless with or without family member, having parents in jail, living with alcohol or drug abuser, living with verbally or physically abusive parents/adults, experiencing domestic abuse from parents/adults, and experiencing sexual abuse from family or non-family person.

Measures

Positive Youth Developmental Measures. The measures of developmental skills and supports were created based on the positive youth development research of Search Institute (Search Institute, 2013), and factors from theory and prior research from the 2017 MSS (Rodriguez, 2017). Three developmental supports include Teacher/School Support (TSS), Family/Community Support (FCS), and Empowerment (EM) and three developmental skills include Social Competence (SC), Positive Identity (PI), and Commitment to Learning (CTL).

Two primary sources of validity evidence include content-related evidence (documented in Benson, 1990, 2002; Benson et al., 2006; and Search Institute, 2013) and internal-structure or construct-related evidence (documented in the MSS Technical Report, Rodriguez, 2017). To support construct-related inferences, the internal structure of the measures were evaluated through confirmatory factor analysis (CFA; using Mplus v. 7; Muthén & Muthén, 2012) and differential item functioning analyses by race/ethnicity, gender, and grade (using Winsteps v. 3.92; Linacre, 2016; with results summarized in Rodriguez, 2017). We followed common guideline for adequate fit indices where RMSEA is below than .10, CFI and TLI are greater than .90 (Brown, 2015; Kline, 2011), and standardized factor loadings are .40 or higher (Brown, 2015); although we note that in many factor analytic studies of research surveys, standardized factor loadings of .30 are often used to define salient loadings.

The measures were then scored using the partial credit Rasch model in Winsteps 3.92 (Linacre, 2016). The partial credit Rasch model allows each item to have its own structure (given the ordinal nature of the response scales) and places persons and items onto the same scale. The Rasch reliabilities of these measures were also adequate: CtL (.70), PI (.79), SC (.79), EM (.72), FCS (.71), and TSS (.85).

Bullying Behavior Avoidance. The measure of Bullying was recoded to indicate the absence of bullying (coded as 1) versus some non-zero level of bullying.

Substance Use Avoidance. Students' alcohol and marijuana use are considered risky behaviors. Items regarding substance use in the last 30 days were combined, so a student who did not use these substances is coded 1, versus students who had some level of use (coded 0).

Mental Distress. Similarly, the measure of mental distress was recoded to indicate students with some mental distress (coded 1), versus students with no mental distress (coded 0).

Academic Performance. Self-reported grades of students are used to indicate academic performance. This is on the traditional 4-point scale.

Data Analysis

Structural equation modeling (SEM) was applied using the Lavaan package (Rosseel, 2012) from RStudio software (RStudio Team, 2017) to fit the hypothesized associations among the proposed constructs. To address the first research questions, baseline models that assessed the direct effects of developmental skills and supports on students' behavior and academic

performance. After establishing direct associations, students' mental distress is included into the path model to test its mediating effect. According to Baron and Kenny (1986), a mediator variable accounts partially or completely for the association between other variables. Across all model specifications, covariates such as gender, grade, race/ethnicity, special education status, and free/reduced price lunch status were controlled.

Results

Confirmatory factor analysis verified that the latent constructs measure unidimensional latent variables. The standardized factor loadings ranged from .55 to .88. Two latent constructs, skills and supports, were measured by three observed continuous indicators, respectively. The measurement model provided adequate fit, chi-square (8, N=45,296) = 6531.93, $p < .001$, comparative fit index (CFI) = .95, standardized root mean square error (SRMR) = .05, and root mean square error of approximation (RMSEA) = .12.

Mediation Effects of Students' Mental Distress

The mediation analyses examined the extent to which students' mental distress mediates the associations between students' skills and supports and bullying behavior avoidance and substance use avoidance (Figure 2). The overall model fit was fairly good, chi-square (92, N=45,296) = 16477.75, $p < .001$, CFI = .87, SRMR = .04, and RMSEA = .08. Table 1 presents the results of direct, indirect, and total effects in the final model.

Table 1
Standardized Direct, Indirect, and Total Effects for the Final Model from Skill and Support to Bullying Behavior Avoidance and Substance Use Avoidance

Predictor	Bullying Behavior Avoidance			Substance Use Avoidance		
	Direct	Indirect	Total	Direct	Indirect	Total
Developmental Skill	0.72	0.01	0.73	0.87	0.01	0.88
Developmental Support	-0.43	0.04	-0.40	-0.62	0.03	-0.59

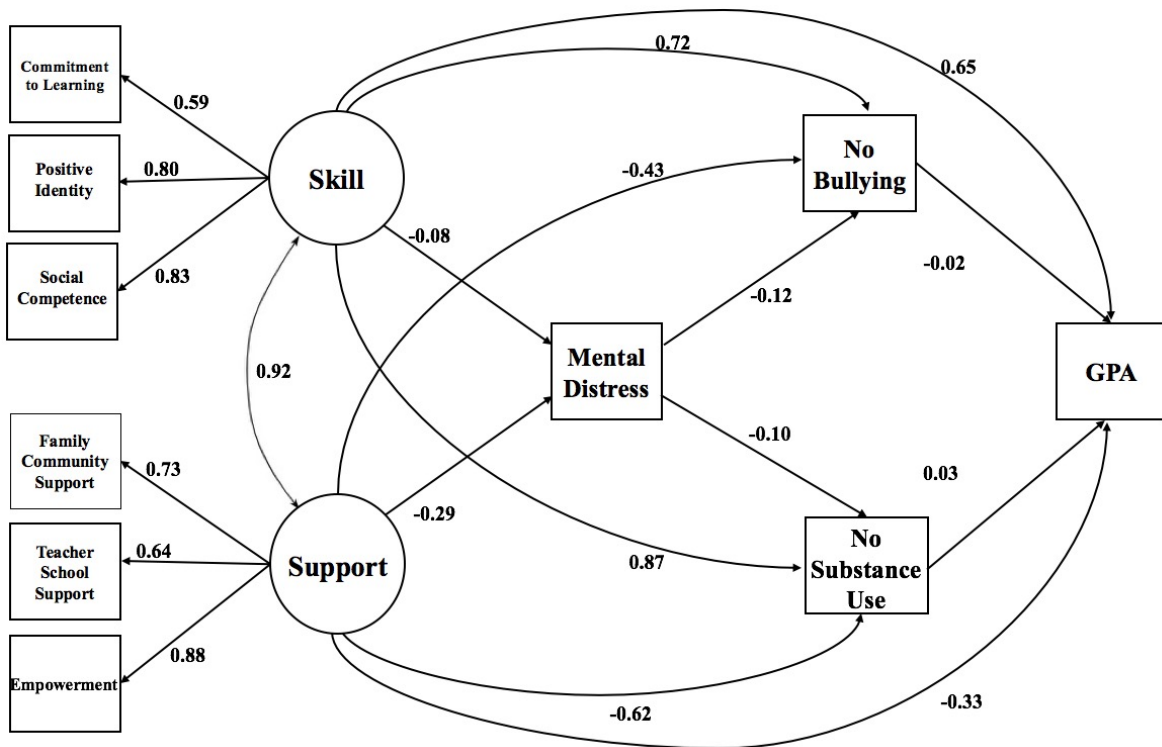*Note*: All effects significant at $p < .001$.

Figure 2. Final structural model depicting mediational effect of mental distress between youth developmental skill and support assets and adolescents' bullying and risky behaviors. All coefficients shown are standardized (***$p < .001$).

Skills was positively associated with bullying behavior avoidance (ß=0.72, *p*<.001) and also positively associated with substance use avoidance (ß=0.87, *p*<.001). Supports was negatively associated with bullying behavior avoidance (ß=-0.43, *p*<.001) and also negatively associated with substance use avoidance (ß=-0.62, *p*<.001). The associations between skills/supports and bullying behavior avoidance and the associations between the skills/supports and substance use avoidance were significantly mediated by students' mental distress.

Predicting Academic Performance

In the mediational effect model, bullying behavior avoidance is negatively associated with students' self-reported grades (ß=-0.02, *p*<.001) and substance use avoidance is positively associated with self-reported grades (ß=0.03, *p*<.001).

Discussion and Significance

In this study we conceptualize a pathway to resilience for students who have at least one traumatic experience, including risk and protective factors identified from previous literature. Due to the multidimensional nature of the concept "resilience," a process consisting of dynamic interactions among youth risk and protective factors, resilience process as a pathway is suggested and examined. This study contributes to the literature by identifying the direct associations among youth developmental skills and supports and adolescents' bullying behavior avoidance and substance use avoidance, indirect effects of mental distress, and lastly the extent to which these direct and indirect associations are related to students' academic performance.

We found that youth developmental skills is positively related to both bullying behavior avoidance and substance use avoidance, whereas the developmental supports is negatively related to bullying behavior avoidance and substance use avoidance. Most of the traumatic experiences used to identify students who have experienced trauma indicate household challenges and this implies that for the students who are already exposed to one of those traumatic event, supportive factors such as family/community support, teacher/school support, and empowerment are not significantly related to students' bullying behavior avoidance and substance use avoidance.

The associations among developmental skills and supports and adolescents' bullying and risky behaviors were mediated by students' mental distress. The total effect, including direct and indirect effects, increased in predicting students' bullying and risky behavior avoidance, indicating mental distress positively mediated the associations with skills and supports. This finding supports the idea that mental distress as an external stimuli positively activates the resilience process (Kumpfer, 2002). Another interesting finding is that bullying behavior avoidance is negatively associated with academic performance.

In the future research, we will further investigate the associations between students' supportive factors and negative behaviors. Moreover, the proposed model will be tested including different outcomes such as students' academic aspiration with the group of students with and without traumatic experiences and be examined its model fit to each group.

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