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Title: The Use of Student Self-Report Screening Data for Mental Health Risk Surveillance

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Abstract Body

Background / Context:
Child and adolescent mental health disorders are known to increase the risk for numerous poor school and life outcomes for children and adolescents including suicidal ideation and attempts, academic underachievement and school dropout, substance use and disorders, and physical fighting or victimization by a weapon (Bradley, Doolittle, & Bartolotta, 2008; Brown & Grumet, 2000; Dowdy, Furlong, & Sharkey, 2012; O'Connell, Boat, & Warner, 2009). A preventive approach to mitigating associated impairment, morbidity, and poor outcomes in school settings has been advised for at least four decades (Cowen et al., 1973). The widespread adoption of preventive models, methods, and procedures for achieving this goal, however, has remained nascent in U.S. schools (Jamieson & Romer, 2005).

Schools have long been identified as the community context of choice for delivering preventive mental health services. As major societal institutions, schools provide an organizational structure that reaches more children with more continuity than primary care, or any other child and family service setting (Doll & Cummings, 2008). Schools, however, are rather unprepared to provide preventive mental health services due to limited staff training, time commitment to educational service delivery, and a lack of assessment methods for delivering services such as universal screening (Fox, Halpern, & Forsyth, 2008; Levitt, Saka, Romanielli, & Hoagwood, 2007; O'Connell et al., 2009).

Universal screening is the first step in any preventive, secondary prevention, or early intervention program for mental health problems (Levitt et al., 2007). A National Academies of Sciences report identified four levels of prevention, including: 1) universal prevention where community risk factors, such as school safety, are of interest, 2) selective prevention where high risk groups, such as children exposed to maternal depression, are identified for services, 3) indicated prevention where screening for behavioral and sub-syndromal symptoms is used to identify children for early intervention services [defined as behavioral or emotional risk (BER), for the purposes of this study], and 4) assessment for detection, diagnosis, and treatment of a mental health disorders (O'Connell et al., 2009).

A central impediment to the adoption of universal screening measures for school-based screening of large groups of children has been the practicality of such measures, especially the associated personnel costs and test administration time that competes directly with the demand for academic instructional time (Dowdy, Ritchey, & Kamphaus, 2010). Although newer screening measures such as the one used in this study require only a few minutes per child, the practicality of screening thousands of students in numerous schools is yet to be determined (Dever, Raines, & Barclay, 2012).

Purpose / Objective / Research Question / Focus of Study:
The current investigation sought to determine:

1. Whether or not a brief self-report screener of behavioral and emotional risk (BER) could be used universally in middle and high school with little concern about interference with instructional time or other practical concerns.
2. If the screener would produce score differences between schools that were consistent with school administrator concerns, which predicted that some schools were characterized by more adolescent BER than others.
3. Whether or not demographic variables such as child race/ethnicity, gender, SES, or grade level were strongly associated with screener scores.

4. If individual screener results demonstrated discriminant validity by assessing their association with classification as eligible for special education programs due to the presence of severe behavioral and emotional problems or diagnosed mental health disorders.

Setting:
Data were collected from 3 middle and 4 high schools in a mid-sized city in the Southeastern United States. The school district from which these schools were selected consists of a total of 7 middle and 7 high schools, of which half participated in the current study. The 7 schools selected for the present study were new recipients of federal School Improvement Grants due to low academic performance. The district administrators requested universal screening for each of the participating schools because of concerns that student misbehavior may have exceeded that of the other middle and high schools. In addition, several incidents of school violence had occurred on the campus of one of the high schools. Administrators at these schools were interested in gathering baseline data on behavior prior to implementing any school-wide interventions.

Population / Participants / Subjects:
The sample collected included 2,222 adolescents in the 8th through 12th grades. Females constituted 53% of the sample. The ethnic/racial group sample sizes were 1,701 African-American, 456 White, 32 Latino/a, and 26 Other. Sample sizes by school ranged from 95 to 849 (median = 205). The school district has a high poverty rate, with 76% of students in the present study being eligible for a free or reduced price lunch. Approximately 6% of the sample, or 139 adolescents, were classified as special education eligible.

Intervention / Program / Practice:
The *Behavioral and Emotional Screening System* (BESS; Kamphaus & Reynolds, 2007) Student Form is a brief screening measure completed by children or adolescents aged 8 through 18 years to identify BER. The BESS includes 30 items that assess a wide range of child behavior and emotional problems including: internalizing items about worry and sadness; inattention and distractibility items; items assessing poor school attitude; and items assessing social and interpersonal skills. Use of theory and factor analysis to develop the measure resulted in the inclusion of more internalizing items than other screening measures of this length, and a four factor solution including an assessment of inattention/hyperactivity, internalizing problems, school problems, and personal adjustment (Dowdy, Twyford, Chin, DiStefano, Kamphaus, & Mays, 2001). The BESS requires no training and can be completed in 5 minutes or less.

Students are given four rating options—never, sometimes, often, or almost always—for each item and the sum of the items generates a total *T*-score (mean = 50, standard deviation = 10) with higher scores reflecting higher levels of BER. The scoring rubric or risk level for BER is as follows: (a) a *T*-score of 20-60 suggests a "normal" level of risk; (b) 61-70 suggests an "elevated" level of risk; and (c) 71 or higher suggests an "extremely elevated" level of risk. The risk level classification cut-scores were developed to maximize sensitivity and specificity, and results suggest that sensitivity, specificity, positive predictive value, and negative predictive value were generally high (Kamphaus & Reynolds, 2007).

Research Design:
A prospective, cross-sectional survey design was chosen in order to provide surveillance data for these 7 schools at one point in time, prior to choosing/implementing school-wide interventions.

Data Collection and Analysis:
A brief screening measure, the BESS Student Form, was administered to all students in groups, usually in homerooms, by school district employed school psychologists and school psychology doctoral students. Administration amounted to approximately fifteen minutes per classroom including the reading of instructions from a script, completion of forms, and collecting forms from all students. Total administration was less than 1 hour total per middle or high school since all data were collected at the same time interval, in most cases during the homeroom period. The cost of the screening instrument was approximately $1 per child. The data collection, entry, cleaning, file preparation, and analyses were either conducted or supervised by a post-doctoral fellow supported by the Georgia Measurement and Assessment Training (GMAT) program (grant # R324B080D06 from the Institute of Education Sciences, US Department of Education).

Findings / Results:
Descriptive statistics for the sample by school are shown in Table 1. In order to test whether the screener would produce score differences between schools that were consistent with school administrator concerns, an Analysis of Variance (ANOVA) comparing schools was conducted. This ANOVA revealed statistically significant differences in the four factor scores among the seven schools with F values ranging from 4.73 for the internalizing factor to 8.20 for the inattention/hyperactivity factor, and all tests being significant beyond $p < .001$. These results supported the a priori predictions of the school administrators in that the high school that had experienced increases in school violence (High School #3) and its feeder middle school (Middle School #3) had the highest means on the deviant factors and the lowest means for the positive adjustment factor. However, as demonstrated in Figure 1, these statistically significant differences across school by factor were small.

The third question of interest was whether or not demographic variables such as child race/ethnicity, gender, SES, or grade level were strongly associated with screener scores. The ANOVA by child gender was statistically significant for only the adjustment problems ($F = 6.79$, $p < .009$) and internalizing factors ($F = 25.35$, $p < .001$), where girls obtained higher scores on each. BESS scores also differed significantly by grade level for all four factors; adjustment ($F = 3.87$, $p < .004$), inattention/hyperactivity ($F = 6.23$, $p < .001$), internalizing ($F = 2.82$, $p < 0.24$), and school problems ($F = 6.99$, $p < .001$). Figure 2 plots means for the four factors by grade level. These data reveal a trend for self-reported problems to increase in high school over levels reported by eighth graders.

Socioeconomic status produced the most non-significant findings in that free or reduced lunch eligibility status, unlike the other demographic variables, did not produce any statistically significant differences between the BESS factors. BESS results for student ethnicity, by contrast, did differ for the African American and White groups. All four BESS factors differed for these two groups ($p < .001$), with White students reporting more deviance and fewer positive adjustment skills. The results for the other two groups were too small to interpret with confidence.

In relationship to our fourth research question, special education status was linked statistically to only two of the BESS factors: adjustment ($F = 60.10$, $p < .001$) and internalizing

($F = 47.30$, $p < .001$). Special education status was not a significant predictor of inattention/hyperactivity or school problems in the present study.

All of these analyses were repeated utilizing BESS classification scheme as the outcome variable. The BESS BER classification system as noted earlier has three levels: normal, elevated, and extremely elevated risk. These results were similar to those found using factor scores. For example, no differences were found between BESS factors by SES, more White adolescents were classified as elevated and extremely elevated in risk than African-American adolescents, and girls (13.5%) acknowledged a higher prevalence rate of risk than boys (11.5%). In comparisons where ANOVA results were significant, all Chi Square tests of differences in proportions were also statistically significant.

Conclusions:

Student self-report screening results may provide schools and community stakeholders with systematic data about mental health risk that may be used to address and monitor the mental health needs of adolescents in school. These data may also be used to disaggregate BER status for different levels of analysis, such that prevention and intervention planning can be considered at the classroom, school, sub-district, and school district levels, and even region and state levels if desired. Comparisons can then be made across levels of analysis and service delivery to determine where significant BER exists, whether there are inattention/hyperactivity, internalizing, or school problems, or an absence of strengths as assessed by the adjustment factor. This "targeting" of systems in need of change or improvement based on data holds the potential to better focus prevention and intervention efforts based on evidence.

While a full cost and practicality analysis of this measure and methodology was not undertaken for the purposes of this study, the ability to gather these individual student data from an entire school taking less than one hour of instructional time per academic year using a relatively low cost screening instrument portends greater practicality than has been the case in the past. In effect, the results confirmed the a priori hypothesis of school administrators about which schools were the most problematic in terms of youth behavioral maladjustment. Thus, school administrators used these results to bolster their confidence about which schools would require new policies, procedures, or practices to improve youth outcomes. Screening data also informed school personnel regarding which types of problems were most common among their school population in order to plan school-wide prevention and intervention activities. For example, recognizing the prevalence of reported school problems as opposed to internalizing problems may provide for a more efficient resource allocation.

Limitations

The sample sizes for this study among particular demographic subgroups were sometimes minimal. Although screening was conducted universally, the sampling did not include all children in a school due to student absences and the exclusion of some classrooms due to disability classifications that prevented participation. Sample sizes were not adequate to conduct some important analyses, such as including a Latino/a sample in the ethnic group comparisons. Due to time limitations only one screener was used. Although the BESS has supportive reliability and validity evidence, it is relatively new. A clear "gold standard" among such school-based screening measures has yet to emerge based on consensus use; therefore, more research is needed regarding the choice of screening assessment and direct comparisons to other well-known clinical screening tools are needed.

Appendix A. References

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Appendix B. Tables and Figures

Table 1

Descriptive Statistics: Factor Score Means and Standard Deviations for four BESS factors by School

SCHOOL		Adjustment Factor*	Hyperactivity Factor*	Internalizing Factor*	School Problems Factor*
Middle School 1	Mean	3.3684	1.7209	1.6852	1.7966
	N	147	147	146	147
	Std. Deviation	.50167	.51180	.49201	.55487
Middle School 2	Mean	3.2468	1.6737	1.7022	1.6825
	N	95	95	95	95
	Std. Deviation	.53925	.47835	.51825	.47582
Middle School 3	Mean	3.1277	1.8622	1.8493	1.9603
	N	105	105	105	105
	Std. Deviation	.58581	.54774	.53887	.60221
High School 1	Mean	3.2878	1.8114	1.7980	1.9635
	N	205	205	205	205
	Std. Deviation	.53559	.52631	.54994	.57015
High School 2	Mean	3.3764	1.6854	1.6355	1.9460
	N	368	368	368	368
	Std. Deviation	.47221	.46557	.45389	.51496
High School 3	Mean	3.2300	1.8855	1.7607	1.9912
	N	849	849	848	849
	Std. Deviation	.54561	.55194	.49715	.55366
High School 4	Mean	3.3151	1.8172	1.7385	1.9836
	N	453	453	453	453
	Std. Deviation	.50231	.54746	.46482	.51579
Total	Mean	3.2820	1.8105	1.7356	1.9521

	N	2222	2222	2220	2222
	Std. Deviation	.52681	.53454	.49409	.54514

* $p < .001$

Figure 1. Factor Score Means for four BESS factors by school

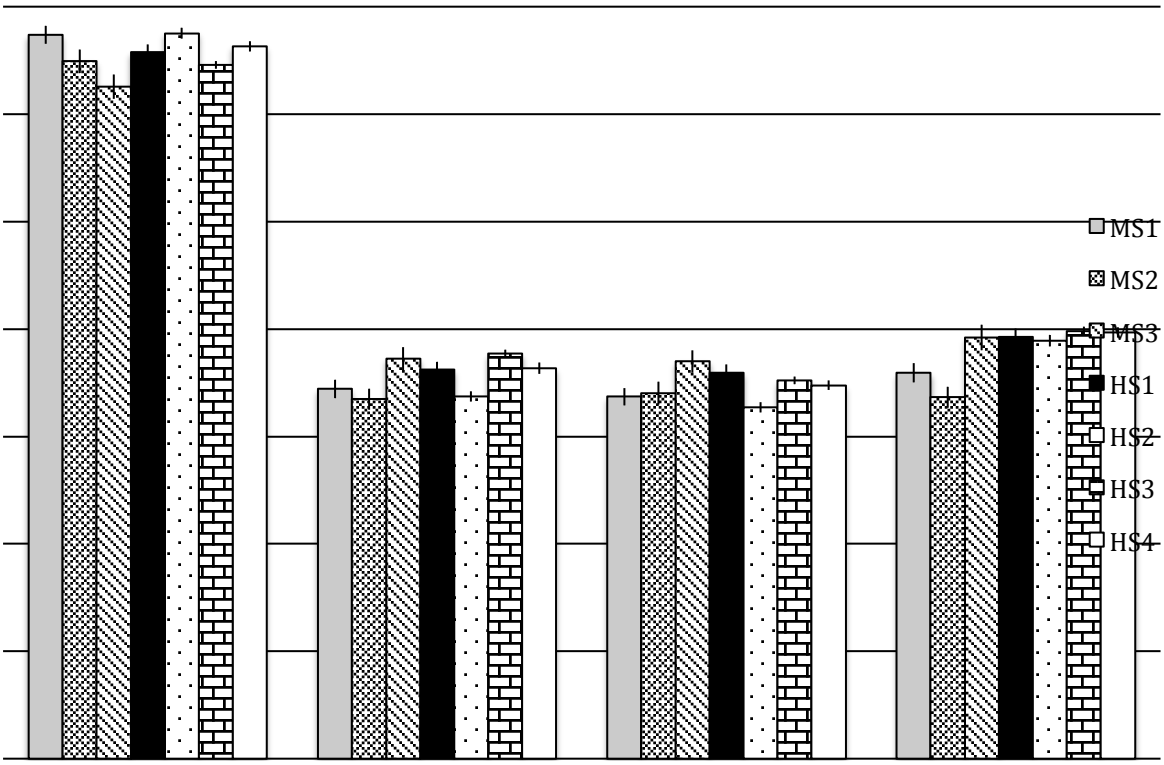

Figure 2. Factor Score Means and Standard Deviations for four BESS factors by student grade