Predictive Validity Test of the Adolescent Domain Screening Inventory with an Anti-Social Adolescent Population

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Abstract: Introduction: Literature demonstrates the connections between antisocial behavior and substance use. The Adolescent Domain Screening Inventory (ADSI), has shown high predictive validity for both risk of substance use and problematic substance use. This study hypothesizes that the ADSI will demonstrate acceptable predictive validity for use with an anti-social population.

Materials and Methodology: A secondary analysis was conducted, and binary logistic regressions run to determine the predictive validity on an anti-social behavior variable. Results: The ADSI correctly predicted anti-social behavior 83.5% of the time.

Discussion and Conclusion: The results of this predictive validity analysis indicate that the Adolescent Domain Screening Inventory shows promise for use as an instrument to assess adolescents for high risk status for antisocial behavior, and warrants further investigation for such use.

Keywords: Screening; adolescent; antisocial behavior; risk factors.

INTRODUCTION
Antisocial behavior in juveniles is a problem that continues to present challenges to the justice and therapeutic communities. According to the Office of Juvenile Justice and Delinquency Prevention, “more than 70 million Americans—about 1 in 4—are younger than 18, the age group commonly referred to as juveniles. This age group has increased consistently since the mid-1980s and is projected to continue increasing until at least 2060,” (OJJDP, 2017). On a positive note, rates of violent crime on the part of juveniles have decreased in the last twenty years. (OJJDP, 2015).

However, the occurrence of violent crime and other antisocial behaviors committed by juveniles is still worrisome. “In 2011, the serious violent crime offending rate was 6 crimes per 1,000 juveniles ages 12–17, with a total of 154,000 such crimes involving juveniles” (FIFCFS, 2013, p. 45). That same report indicated that 5.1% of eighth graders, 15.6% of tenth graders and 23.7% of 12th graders reported having 5 or more alcoholic beverages in a row within 14 days of the survey.

In that same year, 2011, a report focusing on young adults found 170,847 males and 10,256 females between ages 18 and 24 were imprisoned in adult correctional facilities. (Federal Interagency Forum on Child and Family Statistics, 2014). This study also focused on young adults who have been diagnosed with a Substance Use Disorder. This study found slight decreases in reports of Substance Use Disorders, between 4.3% and 2.1%. Yet, the numbers that were found, 17.7% of young adults between the ages of 18-19, 20.2% between the ages of 20-21 and 19.6 between the ages of 21-22, indicates that substance use remains a concern for young people. (FIFCFS, 2014).

Other research has focused not only on reported behaviors but also on actual diagnoses of either conduct disorder, oppositional defiant disorder or antisocial personality disorder. In 2013, the Center for Disease Control, Morbidity and Mortality Weekly Report found that 2.1% of children ages 8-15 years old present with conduct disorder. The report focused on parent-reported data from National Survey on Children’s Health and showed that 4.6% of children aged 3–17 years had a history of a behavioral or conduct problem such as oppositional defiant disorder or conduct disorder. In addition, an estimated 3.5% of children had a current behavioral or conduct problem. This could amount to as many as 2,833,000 children. The report also indicated that prevalence of conduct disorder increased with age with the higher numbers found in older adolescence. (CDC, 2013).

Chun, Mace and Katz (2016) found that students with learning disabilities and diagnoses of emotionally disturbed had significantly higher rates of delinquent behavior than the general population. They also found that the trends continued to be evident in adult arrests.

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There has been an abundance of literature discussing the connections between antisocial behavior and substance use. Hawkins, Catalano and Miller (1992) conducted an extensive survey of the literature regarding risk factors that are associated with alcohol and other drug abuse among adolescents. The study considered social and cultural factors as well as individual and interpersonal environment factors. (Hawkins, et. al., 1992). Among the 17 risk factors that were considered, “Early and persistent problem behaviors” was explored with a review of sixteen studies dating back to 1978. They also reviewed twelve articles addressing “Alienation and Rebelliousness.” The researchers concluded that, inter alia, early aggressive behavior may be predictive of drug abuse as the child gets older. (Hawkins, et.al., 1992) They also found that certain risk factors combined, as well as the number of risk factors, were significant. In regard to aggressive behavior specifically, the researchers note that further investigation into the connections between behavior disorders such as conduct disorder and Attention Deficit Hyperactivity Disorder was indicated. (Hawkins, et.al., 1992)

Cho, et al. (2014) conducted an investigation on a subset of adolescents from a larger longitudinal study that focused on genetic and environmental factors that influence health and development. The researchers found alcohol use to be predictive of anti-social behavior in older adolescents between the ages of 15 and 17, and that “Early antisocial behavior was predictive of subsequent alcohol use during mid- to late adolescence (from ages 13 to 17),” (Cho et.al., 2014, p. 2029). In another study, Clark, Vanyukov, and Cornelius (2002) identified that the inability to control one’s behaviors made the adolescents diagnosed with antisocial behavior related diagnoses such as conduct disorder and oppositional defiant disorder susceptible to future alcohol use and possible abuse (Clark, et. al., 2002).

Kosterman, et al. (2014) applied the Social Development Model to study prosocial and antisocial pathways for predicting Alcohol Use Disorders in the future. The researchers conducted a longitudinal study over nine years. The study had a large sample (N=808) of subjects in their 20’s through age 30. The study found the alcohol specific antisocial factors, such alcohol based socialization, play significant roles in maintaining Alcohol Use Disorder symptoms throughout young adulthood. The researchers also concluded that this knowledge can provide a focus for prediction and intervention.

The correlations between antisocial behavior and substance use could also be seen across countries. Beyers, Toubbourou, Catalano, Arthur, and Hawkins, (2004) studied both risk and protective factors that were associated with substance use by young people in the United States and Australia. The researchers surveyed young people in grades 6 through 12 in Maine and Oregon in the United States. They also surveyed young people in grades 7 through 11 in the state of Victoria in Australia (Beyers, et. al., 2004). The risk and protective factors focused on included anti-social behavior and favorable attitudes towards anti-social behavior. The researchers found comparable risk and protective factors between the countries. Specifically, “favorable attitudes toward antisocial behavior, sensation-seeking, and antisocial behavior were associated with double or triple the risk for all three substances in both countries,” (Beyers, et. al. 2004, p 13).

A number of instruments have been designed to measure psychopathic traits in adolescents. Most of the instruments were designed for parents or school personnel to administer to students. See for example Frick and Hare’s Adolescent Psychopathic Screening Device, or APSD, (1994). Going on the assumption that self-report instruments may yield more accurate and valid result, researchers focused on the development of self-report instruments. Lee, Vincent, Hart and Corrado (2003) conducted a study of the self-report version of the APSD and found a number of limitations in its validity.

Houghton, Hunter, Kahn and Tan (2014) sought to modify their own other-administered instrument, the Child and Adolescent Psychopathy Screening Instrument (CAPSI) to create a self-report instrument they called the Constellation of Affective and Interpersonal Behaviors Screening Instrument (CAIBSI). The result of these studies was that the CAIBSI was found to be effective at identifying specific psychopathic traits amongst male and female adolescents. (Houghton, et. al., 2014)

Since the literature indicates that there is a significant comorbidity between substance use and antisocial behavior (Obando, Trujillo and Trujillo 2014), good practice dictates the need to identify and predict the occurrence of these issues as early as possible. There are many psychometric instruments designed to identify substance abuse in adolescents (Bivin & Rias, 2017). Some of these instruments described in the article address the co-occurring risks of behavior issues and substance use, such as The Rutgers Alcohol Problem Index, by White & Lebovier (1989), The Problem Oriented Screening Instrument for Teenagers by Santisteban et. al. (1999) and the Personal Experiences Inventory by Winters and Henley (1989).

The Assessment of Liability and Exposure to Substance use and Antisocial behavior (ALEXSA) is an instrument designed to assess substance use and anti-social behavior risk factors early in a person’s development (Ridenour, Clark, and Cottner, 2009). The ALEXSA is a multidimensional, self-report instrument that was studied on school children in Pennsylvania. Two samples of school children were studied, one group was from the general classroom learning setting (N=127) and the others (N=145) were from the remedial classroom learning setting (Ridenour, et.al., 2009). The results of the study indicated promising results for predictive data. The researchers report “excellent or good reliabilities for 9 factors, 34 subscales and 11 of 18 alcohol or tobacco risk index items” (Ridenour et. al, 2009, p. 250). However, the researchers did note a limitation in generalizability give the number of subscales and recommended more research on the application to specific groups (Ridenour et. al, 2009).

Given the common pathways shown thus far between anti-social behavior and substance use, an effective substance use disorder risk assessment instrument might be useful in identifying and predicting anti-social behavior. Corrigan, Loneck and Videka (2007) set out to develop a tool to assess the risk and protective factors related to adolescents and substance use. Starting with the Communities that Care Youth Survey
(CTCYS), which was developed by Hawkins, Catalano and Miller (1992) in their studies on risk and protective factors, Corrigan et al., created a psychometrically tested, brief instrument for use with adolescents. The resulting Adolescent Domain Screening Instrument (ADSI) can measure problem areas, referred to as “domains” that can be used to predict risk and identify protective factors (Corrigan, et al., 2007). The ADSI shows good test-retest reliability (Corrigan and Gurdineer, 2012). The ADSI has also been shown to have high predictive validity for both risk at 93%, and problematic use at 84% (Corrigan, 2014).

The risk and incidence of adolescent and young adult antisocial behavior remains a concern for the social service and criminal justice delivery system. Alcohol and other drug use in adolescence and young adults also continue at rates that require our ability to predict risk and identify protective factors for effective intervention.

Many of the available instruments focus on substance or anti-social behavior. Others focus on the relationships and commonalities between the two areas of concern. A few have tried to predict risk of one based on the other. The ADSI was developed as an outgrowth of the CTCYS and was designed to be a short instrument to predict risk. The literature on risk factors reveals that many risk factors that are predictive of substance abuse are also predictive of other adolescent problem outcomes, including delinquency (Hawkins et al., 1992). An instrument that can track and predict both substance use and anti-social behavior risk can help practitioners plan inclusive interventions for this population.

This study hypothesizes that the Adolescent Domain Screening inventory will demonstrate acceptable predictive validity for use with an anti-social population.

MATERIALS AND METHODOLOGY

Sample

The sampling frame used for these analyses consisted of 26,781 surveys completed by students in grades 9 through 12 in the year 2000. These surveys were collected by prevention providers in eleven sites in New York State, and compiled by the New York State Office of Alcoholism and Substance Abuse Services’ Prevention Bureau in the process of routine practice, over the course of two months. The respondents were mostly urban and suburban youths and were relatively evenly split on grade level and gender. In addition, the sample was primarily white. Sites differed on collection method, although all employed a passive parental consent process and students were given the chance to opt out of participating. Four sites surveyed all willing students in school on the day of data collection. The number of students not in school or not completing usable surveys was not collected. The remaining 7 sites used a random cluster sampling plan. Finally, the data provided for this study were consolidated and stripped of identifying information prior to analysis (Corrigan, et al., 2007).

Measures

The ADSI is an evidence-based, individualized risk and protective factor assessment survey that consists of thirty-three items across four subscales: school, family, community, and individual/peer. It was created through a secondary analysis of more than six thousand completed Communities That Care Youth Surveys collected in the year 2000 in New York State, and is a shortened version of that survey. Several methods of item selection were tested, and the most psychometrically sound method was selected. Concurrent criterion validity correlations range from $r = .85$ to $r = .95$. Correlation for known instrument validity is $r = .56$ and convergent construct validity is $r = .49$. The ADSI demonstrated a general applicability across gender and race (Corrigan, et al., 2007). Test-Retest reliability is high with correlations ranging from $.95$ for the total scale to $.80$ for the community subscale. Internal consistency alphas were acceptable considering the nature of the domain subscales, ranging from $.53$ to $.82$ (Corrigan and Gurdineer, 2012).

Embedded in the CTCYS is an Anti-Social Behavior (ASB) scale from the National Youth Survey, or NYS, (Huizinga & Elliot, 1986). Items were summed to create an anti-social behavior variable, and the top twenty percent of respondents scores are being operationalized as indicative of problematic anti-social behavior.

Procedures

A secondary analysis of this data was conducted to assess the predictive validity of the ADSI in this study. Through the select random cases function in the SPSS software, a random sample of 25% was used, leaving a sample of 6,661 cases. The ADSI items were summed to form a total ADSI score scale. After missing data was replaced with the series mean, all of the items from the NYS anti-social behavior sub-scale were added together to create total ASB scores. The total ASB sub-scale variable was dichotomized, with the bottom 80 % of respondent scores being separated from the top 20% of scores to represent those adolescents truly demonstrating problematic anti-social behavior. Binary logistic regressions were run to determine predictive validity, using the dichotomous ASB variable as dependent variable, with the total ADSI scale variable as the independent.

RESULTS

Table 1 presents the results of the logistic regression analysis of the ADSI scale as independent variable onto the Anti-Social Behavior variable consisting of the top 20% of respondents on the National Youth Survey scale. In this analysis, the ADSI correctly predicts anti-social behavior status 83.5% of the time, with a specificity of 96.1% and sensitivity at 32.2%. The rate of true negatives identified is 85.3% and true positives is 66.9%, that is, the ADSI correctly identifies 85.3% of those who are truly not at risk and 66.9% of those who truly are at risk.

Table 2 presents the results of the significance tests run. All relationships are significant at the $p < .001$ level.

DISCUSSION AND CONCLUSION

The Adolescent Domain Screening Inventory is a reliable and valid, evidence-based, individualized risk and protective factor assessment instrument, with strong predictive validity.
Table 1. Logistic Regression with 0.50 Cutoff - ADSI on Antisocial Behavior.

<table>
<thead>
<tr>
<th>High Risk - Observed</th>
<th>No</th>
<th>Yes</th>
<th>Percentage Correct</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5142</td>
<td>209</td>
<td>96.1</td>
</tr>
<tr>
<td></td>
<td>888</td>
<td>422</td>
<td>32.2</td>
</tr>
<tr>
<td>Overall Percentage</td>
<td></td>
<td></td>
<td>83.5</td>
</tr>
</tbody>
</table>

Note: High Risk - Specificity = 5142/(5142+209) = 96.1%, Sensitivity = 422/(422+888) = 32.2%, False positive = 209/(209+422) = 33.1%, False negative = 888/(5142+888) = 14.7%.

Table 2. Logistic Regression Significance Tests - ADSI on Antisocial Behavior.

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADSI Total</td>
<td>.112</td>
<td>.003</td>
<td>1030.056</td>
<td>1</td>
<td>.000</td>
<td>1.119</td>
</tr>
<tr>
<td>ASB</td>
<td>-5.881</td>
<td>.153</td>
<td>1471.098</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Likelihood</td>
<td></td>
<td></td>
<td>χ²</td>
<td>df</td>
<td>Sig.</td>
<td></td>
</tr>
<tr>
<td>Score</td>
<td></td>
<td></td>
<td>5143.575</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Wald</td>
<td></td>
<td></td>
<td>1383.451</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1460.770</td>
<td>1</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

Note: High Risk – Cox and Snell R2 = .397, Nagelkerke R2 = .313. Dependent reference categories; No Antisocial Behavior.

for identifying adolescents who are at high risk for, or who have initiated, substance use. This study represents a shift in use of this instrument away from its developed purpose to test its potential as a screen for anti-social behavior.

The ADSI seems to do an adequate job at identifying those adolescents at risk for anti-social behavior, correctly predicting high risk status 83.5% of the time. The ADSI is weakest on sensitivity measures, with a relatively high false positive rates of 33.1%. However, its strength is in the specificity at 96.1% and true negative rate of 85.3%. This means that, while an over identification of adolescents at risk of anti-social behavior would result from using this instrument, a worker would feel comfortable in trusting that those adolescents identified as non-problematic truly are non-problematic. Since the consequences of not assessing problems are so grave, and since incorrectly identified youth can be found to be non-problematic upon further assessment, it is thought that it is better practice to use an instrument with good specificity, at the expense of sensitivity.

There are several limitations with this study that merit discussion. Because it was a secondary analysis, sampling for this study was proscribed. Therefore, the study was limited to a convenience sample, rather than a random selection of participants, and thus relied on using statistical controls to compare samples. This sampling frame was limited to primarily urban and suburban, white, New York State adolescents and the study’s generalizability is questionable. Testing of this instrument in other regions of the country could address the generalizability concerns. Also, as a secondary analysis, both the ADSI and the ASB total scale were drawn from the same data. Further testing on new populations should be conducted. However, because the purpose of the study was development of a measure, and not an experiment, a convenience sample of secondary data served the purpose of being a first test for this screen. Finally, the sample was large, calling into question the statistical significance of the relationships observed. Repeated use of this instrument is needed before confidence can be placed on those results.

The result of this predictive validity analysis indicate that the Adolescent Domain Screening Inventory shows promise for use as an instrument to assess adolescents for high risk status for antisocial behavior, and warrants further investigation for such use.

CONFLICT OF INTEREST

The authors have no financial interests or connections that might raise questions of bias in our work.

REFERENCES


