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From Clinical-Developmental Theory to Assessment: The Holistic Student Assessment Tool

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Abstract

This article introduces the Holistic Student Assessment Tool (HSA), an assessment tool to measure children's and adolescent's resiliencies in relation to externalizing and internalizing problem behaviors. The HSA is based on our Clover Leaf model, a research-based clinical-developmental model of resilience and psychopathology. In the present paper, we describe the HSA and how it empirically captures dimensions of the theoretical model. We also present findings on convergent and divergent validity and how the resilience scales predict adolescents' antisocial problem behavior, ADHD, emotional symptoms, and peer problems in a sample of 423 children and adolescents. We contend that evidence-based intervention of youth bullying and aggression needs to be based on sound developmental theory and assessment. The HSA is one of the first attempts at closing the gap between risk-and-resilience approaches to development and assessment.

Keywords: clinical-developmental theory, Holistic Student Assessment, Clover Leaf Model, resiliencies, social-emotional development, psychopathology

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It has been estimated that more than 20 percent of U.S. children and youth aged nine to seventeen suffer from significant behavioral and/or emotional problems and are at risk for school failure (e.g., Costello, Egger, & Angold, 2005). Aggression, violence, and bullying can seriously impact children's and adolescents' mental health (Farrington, 2005). These types of externalizing behavior also interfere with children's ability to develop resilience (Masten & Wright, 2009). The early identification of aggressive behavior psychopathology is a priority, as it can reduce the individual burden and societal costs of related problems later in life as well as promote social-emotional development and well-being (Jones, Dodge, Foster, & Nix, 2002; Powell, Lochman, & Boxmeyer, 2007).

The importance of developing school-based early assessment tools for identifying children's and adolescents' mental health problems, including bullying and antisocial conduct, has been underscored (see Malti & Noam, 2009). Accordingly, several assessment tools for use in school and afterschool contexts have been developed. While these tools traditionally aimed at measuring psychopathology, developmental studies have provided ample evidence for the role of resiliencies and social-emotional development in the genesis and prevention of adolescents' social, emotional, and behavioral problems (e.g., Lansford et al., 2006; Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002).

Based on these findings, there is a growing consensus that school-based assessments need to include both risks and resiliences to fully capture developmental psychopathology (Benson & Scales, 2009; see WHO, 2003). From both a developmental and clinical perspective, holistic measures can be more effective in engaging students in high-quality, evidence-based out-of-school-time activities that fit their developmental strengths and clinical needs (Malti, Liu, & Noam, 2009). Despite the empirical evidence and this emphasis, few

assessments that include strengths-oriented measures have systematically been developed thus far (for an exception, see Guhn et al., 2012; Schonert-Reichl et al., 2012).

This study aimed at contributing to this research gap. We present a new assessment tool, the Holistic Student Assessment (HSA), in which children and adolescents report their resiliencies. The aim is to measure key dimensions of resilience in order to complement existing school-based assessments of psychopathology, including aggression and antisocial conduct. This study sought to evaluate the psychometric properties of the HSA and test the theoretical assumptions between social-emotional skills, resiliencies, and externalizing and internalizing psychopathology.

Theoretical Background: The Clover Leaf Model

The theoretical model underlying the HSA tool —the *Clover Leaf Model*—is a research-based clinical-developmental model of resilience and psychopathology (Malti & Noam, 2009). The model systematically interconnects adolescent psychopathology with social-emotional development and resilience (Noam & Malti, 2008); problem behaviors emerge as developmental disorders, and adaptation emerges from social-emotional development and resiliencies (Noam, 1996, 1999). Hence, young peoples' socio-emotional development and resiliencies may help determine whether early signs of a problem will evolve into a clinically relevant disorder or resolve into healthy development.

In our research and theory on developmental psychopathology, we have systematically linked social-emotional development to resiliency and to the risk of psychopathology (Noam, 1996, 1999). In the clover model, development in adolescence is described as the leaves of a clover, each leaf reflecting a particular kind of social-emotional development (Noam & Malti, 2008; Malti & Noam, 2009). We have labeled the four leaves of the clover as the need for action, assertiveness, interpersonal sensitivity/belonging, and reflection (see Figure 1). Each of these leaves represents resilience factors. However, each of these leaves also has its own risks.

It follows logically from this perspective that socio-emotional development is inevitably linked to specific risks and resiliencies. There are also different windows of risks and psychopathology in each developmental leaf (Noam, Chandler, & LaLonde, 1995). For example, the assertion leaf includes the risk of aggressive behavior problems and is associated with low interpersonal sensitivity (see Malti & Keller, 2009). Thus, the clover model not only distinguishes the pathways for growth which may be used to advance mental health, but its application may also reduce problem behavior and the risks inherent in the developmental process. The HSA empirically captures the resilience dimensions conceptualized in the clover model and, therefore, enables researchers to test the strengths associated with risk and behavioral problems.

In summary, this study aimed at investigating the psychometric properties of the Holistic Student Assessment (HSA). We tested the unidimensionality of the HSA scales and examined the convergent validity of the HSA by studying links between the resiliency scales and psychopathology and adaptive behavior. Previous research has shown associations between social-emotional development and resilience and psychopathology (Noam, Young, & Jilnina, 2006). Based on this research, we aimed at examining the HSA in relation to externalizing (i.e., aggression, ADHD) and internalizing (i.e., emotional symptoms, peer relationship problems) symptomatology. In order to examine the extent to which the HSA scales (Clover Leaf constructs) are jointly related to the Strength and Difficulties Questionnaire (SDQ; http://www.sdqinfo.com/; Goodman, 1997) scales, we conducted multiple regression analyses which contained all Clover Leaf scales as predictors and each of the SDQ scales as dependent variables. Our hypotheses were that adolescents with strengths in their resiliencies related to externalizing problems (i.e., action orientation and assertiveness) would be more likely to also report externalizing problems if their resiliencies related to internalizing symptoms (i.e., interpersonal sensitivity/belonging and reflection) were low, and vice versa, whereas adolescents with a relatively high and balanced profile on

all the four Clover Leafs—i.e., a combination of resiliencies—would report low levels of psychopathology.

Method

Participants

The sample included 423 children and adolescents (Grades 4 to 9; *M* = 12.7 years, *SD* = 1.1) attending 7 public elementary and high schools in Boston, Massachusetts as well as one afterschool program gathering children from several area schools. The sample was comprised of 218 girls (51.5%). We collected data from schools that had, according to public school district records, high rates of at-risk youth and low-income backgrounds, and from sites in which the student populations reflected the ethnic diversity of the Boston public school system.

Measures

Holistic Student Assessment (HSA). The HSA is a newly-developed 84-item measure designed to assess the resiliencies and social-emotional development of children and adolescents aged 10 to 18 years (grade 4 to grade 12). It is based both on our previous research and on the Resilience Inventory developed by Noam and Goldstein (1998) and Song (2003). All HSA items have a 4-point Likert response format (not at all = 0, sometimes = 1, often = 2, almost always = 3).

The HSA contains 9 subscales. For the present study, we used the four scales that represent the four dimensions of the Clover Leaf directly: Action orientation (5 items; e.g., ‘I like being active’, Cronbach’s α = .72), Assertiveness (6 items; e.g., ‘I defend myself against unfair rules’, Cronbach’s α = .69), Interpersonal sensitivity/belonging (8 items; e.g., ‘I try to understand how other people think and feel about things’, Cronbach’s α = .81), and Reflection (9 items; e.g., ‘I think about the social problems of the world’, Cronbach’s α = .86).

The HSA is filled out by the students in a group setting, and the administration of the HSA takes approximately 25-35 minutes.

Strength and Difficulties Questionnaire (SDQ). Children evaluated their social behavior on a 3-point Likert scale using the 25 items of the SDQ. The SDQ contains 5 subscales, each with 5 items: Hyperactivity/inattention; Conduct problems; Peer relationship problems; Emotional symptoms; and Prosocial behaviour. It is a validated and widely used measure of psychopathology and prosocial behavior (e.g., van Roy, Veenstra, & Clench-Aas, 2008). We only focused on psychopathology for the present analysis. In our sample, Cronbach's α was .68 for Hyperactivity/inattention, .53 for Conduct problems, .56 for Peer relationship problems, and .70 for Emotional symptoms.

Procedure

Data were collected during the school-based RALLY (Responsive Advocacy for Life and Learning in Youth) program; the RALLY program provides mental health services and an educational support program to students in school and after-school settings to foster their resiliencies, learning, health, and success (Noam, Winner, Rhein, & Molad, 1996). Students participating in the RALLY program were invited to participate in the HSA by the program staff. Participation in the survey was voluntary and passive consent was obtained from all participants.

Data analytic procedure. Factor analyses were conducted for all Clover Leaf scales to examine their unidimensionality. To test convergent and divergent validity, we explored the relationship between the Clover Leaf and the SDQ subscales using correlation matrices, Fisher's Z-test to compare pairs of correlations, and multiple regressions. In all correlational analyses, we used the continuous mean score across all scale items. Analyses were conducted in SPSS (Version 17).

Results

Unidimensionality and Internal Consistency

The factor analyses and examinations of the scree plots indicated essential unidimensionality for all the Clover Leaf scales. For Action orientation, Interpersonal sensitivity/belonging, and Reflection, only one eigenvalue was greater than 1, and all items had loadings of .4 or higher (ranging from .45 to .73). For Assertiveness, the first eigenvalue was 3.5 and the second eigenvalue was 1.0; hence, the ratio of the 1st to 2nd eigenvalue indicated essential unidimensionality, as did the scree plot and the item loadings (ranging from .48 to .67).

Convergent and Divergent Validity

Table 1 shows the Pearson zero-order correlations among the Clover Leaf scales and the SDQ scales. To test the convergent and discriminant validity, we compared the correlations of the Clover Leaf constructs with the SDQ scales. We used Fisher's Z-test to test the statistical significance between two correlation coefficients from one sample. (We used an online tool by Uitenbroek, 1997; http://www.quantitativeskills.com/sisa/statistics/correl.htm).

The primary hypothesis was that the Clover Leaf Action orientation and Assertiveness scales would be significantly more protective against (i.e., negatively correlated with) the SDQ scale that is indicative of internalizing problems (i.e., emotion symptoms) than against the corresponding externalizing SDQ scales (i.e., hyperactivity and conduct problems). Interpersonal sensitivity/belonging and Reflection, on the other hand, were assumed to be significantly more protective against the SDQ scales indicative of externalizing problems (i.e., hyperactivity and conduct problems) than against the corresponding internalizing SDQ scales (i.e., peer problems and emotion symptoms).

As can be seen in Table 1, Action orientation correlated negatively with peer problems and emotional problems. Similarly, Assertiveness correlated negatively with peer problems. Moreover, Interpersonal sensitivity/belonging correlated negatively with ADHD, conduct problems, and peer problems. Reflection was negatively associated with ADHD and conduct problems.

Multiple Regressions: Predicting Psychopathology by Resiliencies

Next, we predicted externalizing and internalizing symptoms by the Clover Leaf resiliency scales. Table 2 shows the results for the multiple regression analyses. Overall, the coefficients were similar to the zero-order correlations. The coefficients for Action orientation and Assertiveness were positive in relation to hyperactivity and conduct problems, but negative in regard to peer problems and emotion symptoms. For Interpersonal sensitivity/belonging and Reflection, the pattern was (mostly) reversed: Interpersonal sensitivity/belonging had a positive coefficient in relation to emotion problems, but high negative coefficients in relation to hyperactivity and conduct problems. Reflection had a positive coefficient with respect to -peer problems, but a negative coefficient in relation to hyperactivity.

The only noticeable difference between the zero-order correlations and the regression coefficients was observed in the model in which the four Clover Leaf constructs predicted conduct problems. The zero-order correlation between Assertiveness and conduct problems (r = .04) was not significant; however, in the presence of the other Clover Leaf predictors, the coefficient was much larger and statistically significant (r = .19, $p < .001$). At the same time, the coefficient for Interpersonal sensitivity/belonging (r = -.35) was also larger than the corresponding zero-order correlation (r = -.27). Given that Interpersonal sensitivity/belonging and Assertiveness are positively correlated (r = .44), this pattern indicates a suppression effect; that is, the aspect of Assertiveness that is independent of Interpersonal sensitivity/belonging is associated with conduct problems.

The regression model's overall predictive power for hyperactivity (R^2 = .13) is equivalent to a medium-large effect size. For conduct problems (R^2 = .10) and peer problems (R^2 = .07), the R^2 is equivalent to a medium effect size, and for emotional symptoms (R^2= .03), it is equivalent to a small effect size.

Discussion

This study aimed at introducing a new assessment tool, the Holistic Student Assessment (HSA). The HSA measures children's and adolescents' resiliencies to complement existing assessments of psychopathology. It is meant for use in school and out-of-school-time settings. Based on our clinical-developmental theory, the HSA is based on the Clover Leaf model which combines psychopathology and risk with resiliencies and social-emotional development (Malti & Noam, 2009). We presented psychometric properties of the HSA resilience scales and tested the theoretical assumptions regarding the relation between resilience and externalizing and internalizing psychopathology.

Our results are the first to lend empirical support to the HSA as a valid measure of children's and adolescents' resiliencies. Factor analyses showed that the unidimensionality of all the Clover Leaf resilience scales was plausible. Furthermore, the resilience scales mostly exhibited the theoretically-expected convergent and divergent relationships. More specifically, Action orientation was negatively associated with internalizing symptoms (i.e., peer problems and emotional symptoms). Similarly, Assertiveness correlated negatively with internalizing symptoms (i.e., peer problems). In addition, as expected, Interpersonal sensitivity/belonging correlated negatively with externalizing symptoms, but positively with internalizing symptoms (i.e., peer problems). Reflection was negatively related to externalizing symptoms. Taken together, these findings reflect the Clover Leaf model's assumptions regarding the interrelations between resiliences and different types of externalizing and internalizing psychopathology. The negative relationship between Interpersonal sensitivity/belonging and externalizing symptoms is also consistent with previous research that has found a negative relationship between empathy/sympathy and moral emotions and antisocial conduct (Hastings, Zahn-Waxler, Robinson, Usher, & Bridges, 2000; Malti & Krettenauer, in press). Vice versa, the negative association between Action orientation and Assertiveness with internalizing symptoms is in line with related research on social skill deficits in children with depressive symptoms (Perren & Alsaker, 2009).

Interestingly, none of the Clover Leaf resiliency constructs was consistently either a protective factor or a risk factor for all psychopathology scales; rather, each resilience construct was significantly correlated with at least one of the four psychopathology scales. This is in line with our theoretical assumption that the different resiliency scales are associated differentially with different externalizing and internalizing symptoms, suggesting that each resilience scale has a specific function as a measure of social-emotional development and in relation to risk for psychopathology.

In addition to the bivariate relationships between the Clover Leaf resiliency scales and the psychopathology scales, our regression analyses showed that Action orientation predicted ADHD positively, whereas Interpersonal sensitivity/belonging and Reflection predicted ADHD negatively. Furthermore, high Assertiveness and low Interpersonal sensitivity/belonging predicted conduct problems. Given the positive association between Assertiveness and Interpersonal sensitivity/belonging, this pattern indicates a suppression effect which may indicate that Assertiveness, by itself, is indeed a risk factor for antisocial conduct. However, this may only be the case if Interpersonal sensitivity/belonging is missing. In contrast, being both assertive and interpersonally sensitive may contribute to developmentally adaptive outcomes. This interpretation is in line with related research on the social and moral antecedents of bullying (e.g., Gasser & Keller, 2009); children and adolescents with aggression and bullying behavior may not necessarily lack social skills but, rather, may have deficiencies in the moral qualities of empathy and interpersonal sensitivity. The finding also points to the need to assess various resiliencies to fully understand individual risk and protective factors of psychopathology.

Regarding internalizing symptomatology, the results showed that Action orientation and Assertiveness predicted peer problems negatively, whereas Reflection predicted them positively. In addition, emotional symptoms were positively predicted by Interpersonal sensitivity/belonging. These findings are fully in line with the theoretically-expected relations

and provide additional evidence for the notion of resiliencies as a risk factor for psychopathology as well as a protective factor for adaptive behavior development.

In summary, these findings are the first to provide support for the HSA as a psychometrically valid measure of resilience. However, all of the convergent and divergent relationships were based on self-report exclusively and, hence, further examination of the psychometric properties of the HSA with self- and other-reports is warranted. In addition, the alphas for the conduct disorder and peer problem scales were moderate only. However, theses alphas compare to findings from other studies using the self-report version of the SDQ (e.g., Hawes & Dadds, 2004).

Nevertheless, the current results provide evidence that the HSA validly measures the four dimensions of the Clover Leaf model. As such, the HSA has great potential to help tailor interventions based on the developmental needs of adolesents at risk for, or already engaging in, externalizing or internalizing psychopathology. Future research is needed to further assess the psychometric properties of the HSA more comprehensively in diverse samples of children and youth.

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Table 1

Pearson Correlations (p-values) Between the Clover Leaf and the SDQ Scales

	1	2	3	4	5	6	7
1 ADHD							
2 Conduct problems	0.52 (0.00)						
3 Peer problems	0.18 (0.00)	0.29 (0.00)					
4 Emotional problems	0.35 (0.00)	0.26 (0.00)	0.39 (0.00)				
5 Action orientation	**0.07 (0.15)**	0.04 (0.41)	-0.23 (0.00)	-0.10 (0.05)			
6 Assertiveness	-0.07 (0.14)	**0.04 (0.47)**	-0.17 (0.00)	-0.07 (0.18)	0.41 (0.00)		
7 Interpersonal sensitivity/belonging	-0.31 (0.00)	-0.27 (0.00)	**-0.10 (0.04)**	0.08 (0.12)	0.25 (0.00)	0.44 (0.00)	
8 Reflection	-0.24 (0.00)	-0.11 (0.03)	-0.05 (0.27)	**0.00 (0.95)**	0.37 (0.00)	0.60 (0.00)	0.63 (0.00)

Table 2

Standardized Multiple Regression Coefficients (p-values) for Clover Leaf Scales Predicting SDQ Scales

	Externalizing symptoms		Internalizing symptoms	
Dependent variables	ADHD	Conduct problems	Peer problems	Emotional problems
Predictor variables				
Action orientation	0.17 (0.00)	0.05 (0.35)	-0.21 (0.00)	-0.10 (0.06)
Assertiveness	0.09 (0.15)	0.19 (0.00)	-0.13 (0.04)	-0.09 (0.18)
Interpersonal sensitivity/belonging	-0.28 (0.00)	-0.35 (0.00)	-0.09 (0.16)	0.14 (0.03)
Reflection	-0.18 (0.01)	-0.02 (0.73)	0.16 (0.03)	0.01 (0.92)
R^2	0.13 (0.00)	0.10 (0.00)	0.07 (0.00)	0.03 (0.03)

Figure 1

The Clover Leaf Model