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

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A description and test of the Holistic Student Assessment Tool (HSA), an assessment tool to measure children's and adolescents' resiliencies in relation to externalizing and internalizing problem behaviors. The HSA is based on the authors' research-based clinical-developmental Clover Leaf Model of resilience and psychopathology, and is one of the first attempts at closing the gap between risk and resilience approaches in developmental assessment. The HSA was tested in a cross-sectional sample of 423 children and adolescents.

The results lend support to the HSA as a valid measure of children's and adolescents' resiliencies. Furthermore, the resilience scales mostly exhibited the theoretically expected convergent and divergent relationships with the psychopathology scales. In addition, we show how the resilience scales predict adolescents' externalizing and internalizing symptoms. We contend that evidence-based intervention to address youth aggression needs to be based on sound developmental assessment.

It has been estimated that more than 20 percent of U.S. children and youth aged nine to seventeen suffer from significant behavioral and emotional problems and are at risk for school failure (e.g., Costello, Egger, and Angold 2005). Furthermore, 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 and Wright 2009). The early identification of aggressive behavior and the precursors of psychopathology is a priority as it can reduce the individual burden and societal costs of related problems throughout life as well as promote social-emotional development and well-being (Jones et al. 2002; Powell, Lochman, and Boxmeyer 2007).

But why is it important to think about developmental theory and assessment in the prevention of bullying, aggression, and violence among children and youth? Researchers have argued that any evidence-based approach to violence and bullying prevention and intervention needs to be based in a sound developmental theory that identifies important risk- and resilience factors that contribute to, or

impede problem behavior, such as violence and antisocial conduct (Beelmann 2011; Eisner and Malti 2012; Lösel and Farrington 2012; Rutter 2012). In addition to sound developmental models that emphasize a strengths-oriented approach that relies on resiliencies and protective factors (Luthar 2006; Masten 2009, 2011), the use of early developmental screening tools is an important step to ensure that these risk and resilience factors are identified in practice. Assessment results, in turn, can help to inform intervention practice. For example, they can help in the decision-making process associated with the kind of services and the intensity of the intervention that a child may need. For example, children who are at-risk for, or already show elevated levels of aggression and antisocial conduct, may benefit from targeted interventions that utilize resilience factors in the treatment to reduce behavioral outcomes (Malti, Liu, and Noam 2010). Thus, early assessments that systematically integrate developmental research and risk and resilience factors are likely to facilitate the delivery of treatment methods that are sensitive to the developmental needs of the child (Liu, Malti and Noam 2008).

In line with this argument, 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 and Noam 2009). Accordingly, several assessment tools for use in school and afterschool contexts have been developed. Developmental studies provide ample evidence for the role of resiliencies and social-emotional development in the prevention of children's problem behaviors, such as bullying and antisocial conduct (e.g., Lansford et al. 2006; Orobio de Castro et al. 2002).

Despite these findings and an increasing emphasis on social-emotional development and resiliencies in assessment and intervention research (see also WHO 2003. Guhn et al. 2012; Schonert-Reichl et al. 2012), the great majority of existing school-based assessments typically include only questions about risks and symptomatology. From both a developmental and clinical perspective, however, holistic measures that address both risk and resiliencies can be more effective in engaging students in high-quality in-school and out-of-school-time activities that fit their developmental strengths and clinical needs (Malti, Liu, and Noam 2009). In addition, symptom checklists yield clinical and sub-clinical results that far exceed the treatment capacity of schools and associated institutions. Thus, simply from a pragmatic point of view it is important to understand the balance between risk and protective factors and to evaluate the vulnerabilities, problems, strengths, and assets to develop appropriate referral systems.

Here we present a new assessment tool, the Holistic Student Assessment (HSA), in which children and adolescents report their resiliencies and socio-emotional strengths. The aim is to measure key dimensions of resilience and strength in order to complement existing school-based assessments of risk factors and psychopathology, including aggression and antisocial conduct. We sought to evaluate the psychometric properties of the HSA and test the theoretical assumptions between social-emotional skills, resiliencies, and externalizing and internalizing psychopathology.

1. 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 (Noam and Malti 2008; for a comparison with other developmental resilience models, see Noam, Malti, and Karcher, forthcoming). The model interconnects adolescent psychopathology with social-emotional development and resilience; problem behaviors emerge as developmental difficulties, and adaptation emerges from social-emotional development and resiliencies (Noam 1996). 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 1999). In the Clover Leaf Model, development in adolescence is described as the leaves of a clover, with each leaf reflecting a particular form of social-emotional development (Noam and Malti, 2008): need for action, assertiveness, interpersonal sensitivity/belonging, and reflection (Figure 1). Each leaf represents particular resilience factors. However, each of also has its own risks, which represent behavioral and emotional problems (for a detailed description of the Clover Leaf Model, see Noam et al., forthcoming).

Figure 1: The Clover Leaf Model
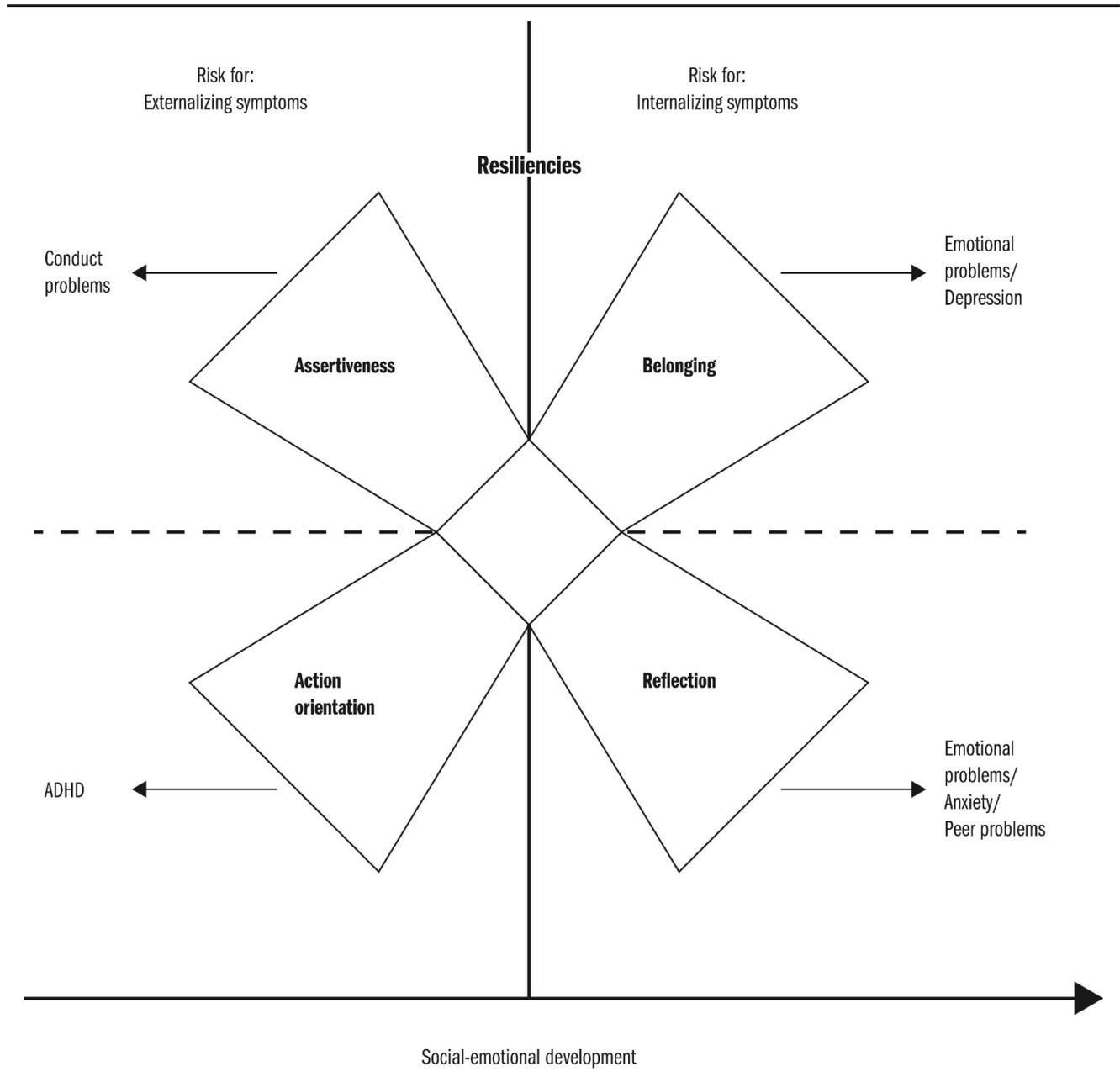
It follows logically from this perspective that socio-emotional development is inevitably linked to specific risks and resiliencies. There are also different windows of risks and psychopathology in each developmental leaf (Noam, Chandler, and LaLonde 1995). For example, the assertive-ness leaf includes the risk of aggressive behavior problems and is associated with high assertiveness (resilience) but low interpersonal sensitivity (risk; see Malti and Keller 2009). Thus, the Clover Leaf 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 Leaf Model and, therefore, enables researchers to test the strengths associated with risk and behavioral problems. The HSA also includes additional dimensions of social-emotional development that have shown to be of significance for behavioral and emotional problems, such as empathy. However, here we focus on the resilience dimensions that directly capture the clover leaves because our interest is in relations between these resilience factors with aggression and antisocial behavior outcomes on the one hand, and internalizing symptoms on the other.

In summary, this study set out to investigate the psychometric properties of the Holistic Student Assessment (HSA). We tested the unidimensionality of the HSA scales, as well as the overall factor structure of the HSA. Unidimensionality of the individual scales was examined via factor analysis, in order to determine the ratio of the first to the second eigenvalue. In addition, the overall factor structure was examined via exploratory factor analysis as well as via exploratory bi-factor analysis (Jennings and Bentler 2011).

We also examined the convergent validity of the HSA by studying links between the resiliency scales and psychopathology. Previous research has shown associations between social-emotional development and psychopathology (Noam, Young, and Jilnina 2006). Based on this research, examined 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 resilience scales (Clover Leaf constructs) are jointly related to the scales of the Strength and Difficulties Questionnaire (SDQ; Goodman 1997), we conducted multiple regression analyses which contained all Clover Leaf scales as predictors and each of the SDQ scales as dependent variables. In addition to the beta coefficients of the multiple regressions, we report Pratt's measure of variable importance for each predictor variable, because this identifies whether specific predictor variables func-

tion as suppressor variables in the multiple regression context (Thomas, Hughes, and Zumbo 1998).

Our hypotheses were that children who had high resiliencies related to externalizing problems (action orientation and assertiveness) would be more likely to report externalizing problems if their resiliencies related to internalizing symptoms (interpersonal sensitivity/belonging and reflection) were low. In addition, children with a relatively balanced profile on all the four clover leaves – i.e., a combination of resiliencies – would report low levels of symptoms. In other words, we expected the beta coefficients of the predictor variables to be generally larger than their respective zero-order correlations (i.e., represent suppression effects). This hypothesis is based on the theoretical assumption that high action orientation, assertiveness, interpersonal sensitivity, and reflection are only associated with externalizing and internalizing problems respectively, to the extent that they are not balanced by competencies in the other three domains (see Noam, Malti, and Karcher, forthcoming).

2. Method
2.1. Participants
The sample comprised 423 children and adolescents (grades 4 to 9; M = 12.7 years, SD = 1.1; 52 percent girls) attending ten public elementary, middle, and junior high schools in Boston, Massachusetts. We collected data from schools that had high proportions of at-risk youth and low-income backgrounds according to public school district records. The student populations reflected the ethnic diversity of the Boston public school system.

2.2. Measures
Holistic Student Assessment (HSA). The HSA is a newly-developed eighty-four-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 on our previous research and on the Resilience Inventory developed by Noam and Goldstein (1998) and Song (2003). All HSA items have a four-point Likert response format (not at all = 0, sometimes = 1, often = 2, almost always = 3).

The HSA contains nine subscales. For the present study, we used the four scales that represent the four dimensions of the Clover Leaf Model directly: action orientation (five items; e.g., "I like being active," Cronbach's α = .72); assertiveness (six items; e.g., "I defend myself against unfair rules," Cronbach's α = .69); interpersonal sensitivity/belonging (eight items; e.g., "I try to understand how other people think and feel about things," Cronbach's α = .81); and reflection (nine items; e.g., "I think about the problems of the world," Cronbach's α = .86).

The HSA is filled out by the students in a group setting with careful adult supervision, and its administration takes approximately 20 minutes.

Strength and Difficulties Questionnaire (SDQ). Children evaluated their social behavior on a three-point Likert scale using the twenty-five items from the SDQ (Goodman 1997). The SDQ contains five subscales, each with five 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, and Clench-Aas 2008). In our sample, Cronbach's α was .68 for hyperactivity/inattention (ADHD), .53 for conduct problems, .56 for peer relationship problems, and .70 for emotional symptoms.

2.3. Procedure
Participation in the survey was voluntary.

Data analysis procedure. In step 1, separate factor analyses were conducted for all individual Clover Leaf scales to examine their unidimensionality (i.e., according to the ratio of first to second eigenvalue). In step 2, the overall factor structure of the HSA items was examined via ex-

ploratory factor analysis and exploratory bi-factor analysis (Jennings and Bentler 2011). Exploratory bi-factor analysis allows examination of the nature of second-order factors. in cases in which factors are correlated, and most or all items load one general factor – similar to how one may find a g-factor for intelligence, that accounts for the correlation among subscales of intelligence.

To test convergent and divergent validity, we explored the relationship between the Clover Leaf and SDQ subscales using correlation matrices, Fisher's Z-test to compare pairs of correlations, and multiple regressions. In the multiple regression analyses, gender was included as a covariate, to control for gender differences. Finally, taking into account the zero-order correlations and the beta coefficients from the multiple regression analyses, we calculated Pratt's measure of variable importance for each predictor variable (Thomas et al. 1998). Pratt's measure helps to interpret the importance of predictor variables in the presence of suppression effects, as well as multicollinearity. In all correlational analyses, we used the continuous mean score across all scale items. Analyses were conducted in SPSS (version 17).

3. Results
3.1. Unidimensionality of the Clover Leaf Scales
The factor analyses and examinations of the scree plots indicate essential unidimensionality for all the Clover 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 first to second eigenvalue indicated essential unidimensionality, as did the scree plot and the item loadings (ranging from .48 to .67).

3.2. Overall Factor Structure

Table 1: Higher order factor analysis

Items	g	Factor 1	Factor 2	Factor 3	h2
Reflection 1 (65)	.69	.28			.56
Reflection 2 (48)	.57	.25			.39
Reflection 3 (79)	.65	.25			.49
Reflection 4 (58)	.70	.31			.60
Reflection 5 (80)	.62	.23			.44
Reflection 6 (81)	.60				.43
Reflection 7 (76)	.52				.33
Reflection 8 (77)	.47				.29
Interpersonal 1 (5)	.36		.59		.48
Interpersonal 2 (22)	.42		.58		.51
Interpersonal 3 (35)	.45		.61		.57
Interpersonal 4 (4)	.28		.36		.21
Interpersonal 5 (8)	.40		.41		.34
Interpersonal 6 (23)	.45		.23		.27
Interpersonal 7 (34)	.47		.33		.33
Interpersonal 8 (38)	.52				.33
Action 1 (89)	.29			.61	.46
Action 2 (90)				.49	.25
Action 3 (91)				.67	.50
Action 4 (92)	.27			.37	.24
Action 5 (93)	.35			.51	.39
Assertiveness 1 (3)	.38		.24		.21
Assertiveness 2 (63)	.32			.25	.18
Assertiveness 3 (68)	.53			.32	.41
Assertiveness 4 (46)	.40			.23	.23
Assertiveness 5 (56)	.22				.09
Assertiveness 6 (61)	.50				.33

An exploratory factor analysis across all HSA items identified one dominant first factor (eigenvalue of 8.1), explaining 29 percent of the total variance. The second largest eigenvalue was 2.3. The ratio of first to second eigenvalue is thus larger than 3:1, indicating the presence of an overall "resiliency" factor. We proceeded by conducting an exploratory bi-factor analysis (Jennings and Bentler 2011). The results (see Table 1) suggest the presence of three secondary factors, in addition to one primary factor. The fit for the higher-order factor model was good (RMSEA=0.063; Chi-square=769; df=297), and significantly better (p <.001) than for the one-factor solution (RMSEA=0.091; Chi-square=1728; df=350). Five out of eight items from the Clover Leaf reflection scale loaded primarily on the (second-order) factor 1, and the remaining three reflection items loaded on the general factor (g), but not on any of the three second-order factors. Seven of the eight items from the interpersonal sensitivity scale loaded primarily on factor 2, and the remaining interpersonal sensitivity item loaded only on the general factor. All five items from the action scale loaded highly on factor 3. In addition, three of the eight items from the assertiveness scale loaded also on factor 3. One assertiveness item had its highest loading on factor 2, and the remaining assertiveness items did not load significantly on any second-order factor. In sum, three of the four clover leaves were relatively closely reproduced by the three second-order factors – the exception being the assertiveness scale. The fact that three assertiveness items loaded on the same second-order factor as all the action orientation items indicates that the two "externalizing scales" are relatively closely associated with each other. The implications of these findings will be discussed below.

3.3. Convergent and Divergent Validity

Table 2 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 (using an online tool described by Uitenbroek [1997]; http://www.quantitativeskills.com/sisa/statistics/correl.htm).

Table 2: Pearson correlations (p-values) between Clover Leaf and 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)

The primary hypothesis was that the Clover Leaf action orientation and assertiveness scale items would be significantly more protective against (i.e., negatively correlated with) internalizing problems as indicated by the SDQ scale (emotion symptoms) than against the corresponding externalizing items on the SDQ scales (ADHD and conduct problems). Interpersonal sensitivity/belonging and reflection, on the other hand, were expected to be significantly more protective against the SDQ scales indicative of externalizing problems (ADHD and conduct problems) than against the corresponding internalizing items on the SDQ scales (peer problems and emotion symptoms). As can be seen in Table 2, 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.

Table 3: Gender differences on predictor and outcome variables

Scale (score range)	Girls, mean (SD)	Boys, mean (SD)	t-value (p-value)
ADHD (0–2)	0.8 (0.4)	0.8 (0.4)	0.1 (.91)
Conduct problems (0–2)	0.5 (0.4)	0.5 (0.3)	1.1 (.26)
Peer problems (0–2)	0.5 (0.4)	0.5 (0.4)	1.5 (.14)
Emotional symptoms (0–2)	0.8 (0.5)	0.6 (0.4)	–3.8 (.00)
Action orientation (0–3)	2.0 (0.6)	2.3 (0.6)	3.6 (.00)
Assertiveness (0–3)	1.9 (0.6)	1.8 (0.6)	–0.2 (.84)
Interpersonal sensitivity (0–3)	2.0 (0.6)	1.9 (0.6)	–2.4 (.02)
Reflection (0–3)	1.8 (0.7)	1.8 (0.6)	0.3 (.78)

Gender differences are shown in Table 3. As expected, girls reported significantly higher levels of emotional symptoms and interpersonal sensitivity, and boys reported higher levels of action orientation. All other scales showed no significant gender difference. Given that gender differences were observed on two of the Clover Leaf scales – which are used as the predictors in the multiple regression analyses – and on one SDQ scale, gender was included as a covariate in all regression analyses.

3.4. Multiple Regressions: Predicting Psychopathology by Resiliencies

Table 4: Standardized multiple regression coefficients (p-values) for Clover Leaf scales predicting SDQ scales

	Externalizing symptoms				Internalizing symptoms			
Dependent variable	ADHD		Conduct problems		Peer problems		Emotional problems	
Predictor variable	β (p)	Pratt score	β (p)	Pratt score	β (p)	Pratt score	β (p)	Pratt score
Gender	0.06 (0.21)	0%	0.00 (0.98)	0%	–0.11 (0.03)	10%	0.15 (0.00)	**56%**
Action orientation	0.18 (0.00)	9%	0.05 (0.36)	2%	–0.24 (0.00)	**68%**	–0.07 (0.20)	**14%**
Assertiveness	0.08 (0.18)	–4%	0.19 (0.00)	8%	–0.12 (0.05)	**25%**	–0.10 (0.12)	**14%**
Interpersonal sensitivity	–0.29 (0.00)	**65%**	–0.34 (0.00)	**91%**	–0.06 (0.30)	7%	0.10 (0.10)	**16%**
Reflection	–0.18 (0.01)	**31%**	–0.02 (0.73)	2%	0.15 (0.04)	–9%	0.02 (0.73)	0%
R^2	0.14 (0.00)		0.10 (0.00)		0.08 (0.00)		0.05 (0.01)	

Next, we predicted externalizing and internalizing symptoms by the Clover Leaf resiliency scales. Table 4 shows the results for the multiple regression analyses. The regression model's overall predictive power for hyperactivity ($R^2 = .14$) was equivalent to a medium/large effect size. For conduct problems ($R^2 = .10$) and peer problems ($R^2 = .08$), the R^2 was equivalent to a medium effect size, and for emotional symptoms ($R^2 = .05$), it was equivalent to a small effect size. Overall, the coefficients were similar in pattern to the zero-order correlations, but the findings also indicated the presence of several suppression effects.

3.4.1. Externalizing Problems: ADHD and Conduct Problems
Interestingly, the zero-order correlations between action orientation and ADHD, as well as between assertiveness and conduct problems were statistically not different from zero. However, in the multiple regressions, the beta coefficients for action orientation in relation to hyperactivity ($r = .18$, p < .001) and assertiveness in relation to conduct

problems ($r = .19$, p < .001) were larger, and statistically significant. In other words, action orientation only predicted ADHD, and assertiveness only predicted conduct problems, in the presence of the other Clover Leaf predictor variables. These findings suggest that interpersonal sensitivity and reflection are protective factors with regard to ADHD and conduct problems; this was indicated by the zero-order correlations and the negative (and statistically significant) beta coefficients. In fact, interpersonal sensitivity was the most important variable with regard to ADHD (Pratt = 65 percent) and conduct problems (Pratt = 91 percent). Also, the Pratt indices, zero-order correlations, and beta coeefiicents indicate that action orientation contributes to the regression (with ADHD as the outcome variable) as a suppressor: The beta coefficient for action orientation (.18) is of equal size to the beta coefficient for reflection (-.18), but its Pratt score is less than one third (9 percent versus 31 percent). The same pattern is found for assertiveness in the regression with conduct problems as the outcome variable (cf. Thomas et al. 1998).

3.4.2. Internalizing Problems: Peer problems and Emotional Symptoms

In relation to peer problems and emotional symptoms, the zero-order correlations for action orientation and assertiveness were significantly negative, and of almost identical size as the corresponding beta coefficients in the regression analyses. Action orientation was the most important variable with regard to peer problems, according to its Pratt measure (Pratt = 65 percent). In addition, the multiple regression analysis with peer problems as the dependent variable indicated a suppression effect with respect to the reflection scale. The zero-order correlation between reflection and peer problems was not significant; however, in the multiple regression, reflection was significantly associated with peer problems ($r = .15$, $p < .04$).

Again, the beta coeeficients and Pratt scores indicate that a suppression effect is present: In relation to peer problems reflection has a larger beta coefficent than assertiveness; however, the Pratt score is considerably smaller (9 percent versus 25 percent). In other words, reflection seems to predict peer problems to a larger than extent once action orientation, assertiveness, and interpersonal sensitivity are taken into account.

In relation to emotional symptoms, gender was the only significant predictor. The beta coefficients of the four Clover Leaf scales were all not significant. Among all four multiple regression analyses that were conducted, the one on emotional symptoms was the only one that did not show the pattern of a suppression effect.

4. Discussion

The Holistic Student Assessment (HSA) is a new assessment tool designed to measure children's and adolescents' resiliencies and social-emotional development. It complements existing assessments of risk and psychopathology, such as the Strength and Difficulties Questionnaire, in both school and out-of-school-time settings. Conceptually, the HSA is based on the Clover Leaf Model which combines psychopathology and risk with resiliencies and social-emotional development (Malti and Noam 2009). Despite a strong emphasis on resilience and protective factors in the literature (see Rutter 2012), early assessments that integrate social-emotional development and resilience factors are still scarce. However, we argue here that their development is important because they can help tailor intervention strategies for the prevention of bullying, violence, and antisocial conduct.

Our results are the first to lend empirical support to the HSA as a valid measure of children's and adolescents' resiliencies. Factor analyses show that the unidimensionality of the Clover Leaf resilience scales was mostly plausible. Furthermore, the resilience scales mostly exhibited the theoretically expected convergent and divergent relationships. More specifically, action orientation was negatively associated with internalizing symptoms (peer problems and emotional symptoms), while assertiveness correlated negatively with internalizing symptoms (peer problems). In addition, as expected, interpersonal sensitivity/belonging correlated negatively with externalizing symptoms, but positively with internalizing symptoms (peer problems). Reflection was negatively related to externalizing symptoms. Taken together, these findings confirm 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 reporting a negative relationship between empathy and antisocial conduct (Hastings et al. 2000). In contrast, the negative association between assertiveness with internalizing symptoms is in line with related research on social skill deficits in children with depressive symptoms (Perren and 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 hypothesis 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 show that action orientation predict ADHD positively, whereas interpersonal sensitivity/belonging and reflection predict ADHD negatively. As theoretically expected, high assertiveness and low interpersonal sensitivity predicted conduct problems. Given the positive association between assertiveness and interpersonal sensitivity/belonging, this pattern indicates a suppression effect which may indicate that assertiveness alone is indeed not a resilience factor, but a risk factor for antisocial conduct. However, this is only the case if interpersonal sensitivity/belonging is missing. In contrast, being both assertive and interpersonally sensitive is a resilience factor and contribute to developmentally adaptive outcomes. This interpretation is in line with related research on the social and moral antecedents of bullying (e.g., Gasser and Keller 2009); children and adolescents with aggression and bullying behavior may not necessarily lack social skills, but 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 show that action orientation and assertiveness predict peer problems negatively, whereas reflection predicts them positively. In addition, emotional symptoms are positively predicted by interpersonal sensitivity/belonging. These findings are fully in line with the theoretical expectations and provide additional evidence for the notion of resiliencies as risk and protective factors for psychopathology. Specifically, the findings show that each psychopathology, such as aggressive behavior, is associated with a lack in specific resiliencies (e.g., belonging) and high levels in other resiliencies (e.g., assertiveness).

Thus, the HSA can help to detect specific resiliencies and risks in children and adolescents who are at risk for, or already show, elevated levels of aggression and antisocial conduct. Specifically, children with these problem behaviors show high levels on assertiveness but simultaneously low levels of interpersonal sensitivity. This

information can be used to prepare targeted intervention strategies for these children, for example using at-risk children's assertiveness (high resilience) to improve their low levels of interpersonal sensitivity and feelings of belonging and empathy, while they retain their assertiveness and reduce their aggression (see Malti and Noam 2009). Thus, this approach implies that it is important to target at-risk children or children with elevated problem behaviors, such as high levels of aggression, by looking at specific resiliencies (i.e., assertiveness) in order to tailor interventions and strengthen specific other resiliencies (interpersonal sensitivity/belonging). The Clover Leaf Model predicts that a balance between different resilience dimensions is most adaptive. From this perspective, it seems warranted to seek a balance between assertiveness and interpersonal sensitivity for children with elevated aggression levels. This differs from a perspective that focuses exclusively on the reduction of risk factors by emphasizing the child's strengths and using these strengths to overcome risks and vulnerabilities such as low levels of other resiliencies and related problem behaviors.

In summary, these findings provide support for the HSA as a psychometrically valid measure of resilience. However, all of the convergent and divergent relationships were based exclusively on self-report, thus a further examination of the psychometric properties of the HSA with self- and other-reports is warranted. In addition, Cronbach's alphas for the conduct disorder and peer problem scales were only moderate. However, these alphas compare to findings from other studies using the self-report version of the SDQ (e.g., Hawes and Dadds 2004). Furthermore, our data analysis approach was merely correlational and cross-sectional, and thus no causal implications can be drawn from the current research. Lastly, the resilience factor explained only a relatively small proportion of variance in predicting behavioral outcomes. Future research needs to take into account other well-known risk factors, such as contextual risk factors that contribute to problem behavior, in order to test the relative predictive power of the resilience scales when compared to these classical risk factors (Eisner and Malti 2012). However, previous research suggests that these and related resilience factors predict problem behavior longitudinally (Malti and Krettenauer 2012).

Nevertheless, the current results provide evidence that the HSA validly captures the four dimensions of the Clover Leaf Model. As such, the HSA has potential to help tailor interventions based on the developmental needs and resiliencies of adolesents at risk for, or already engaging in, externalizing or internalizing psychopathology. Early screenings, such as the HSA, can help educators choose more effective strategies in order to reduce bullying and aggressive behavior through a three-tiered delivery system (i.e., promotion, prevention, intervention).

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