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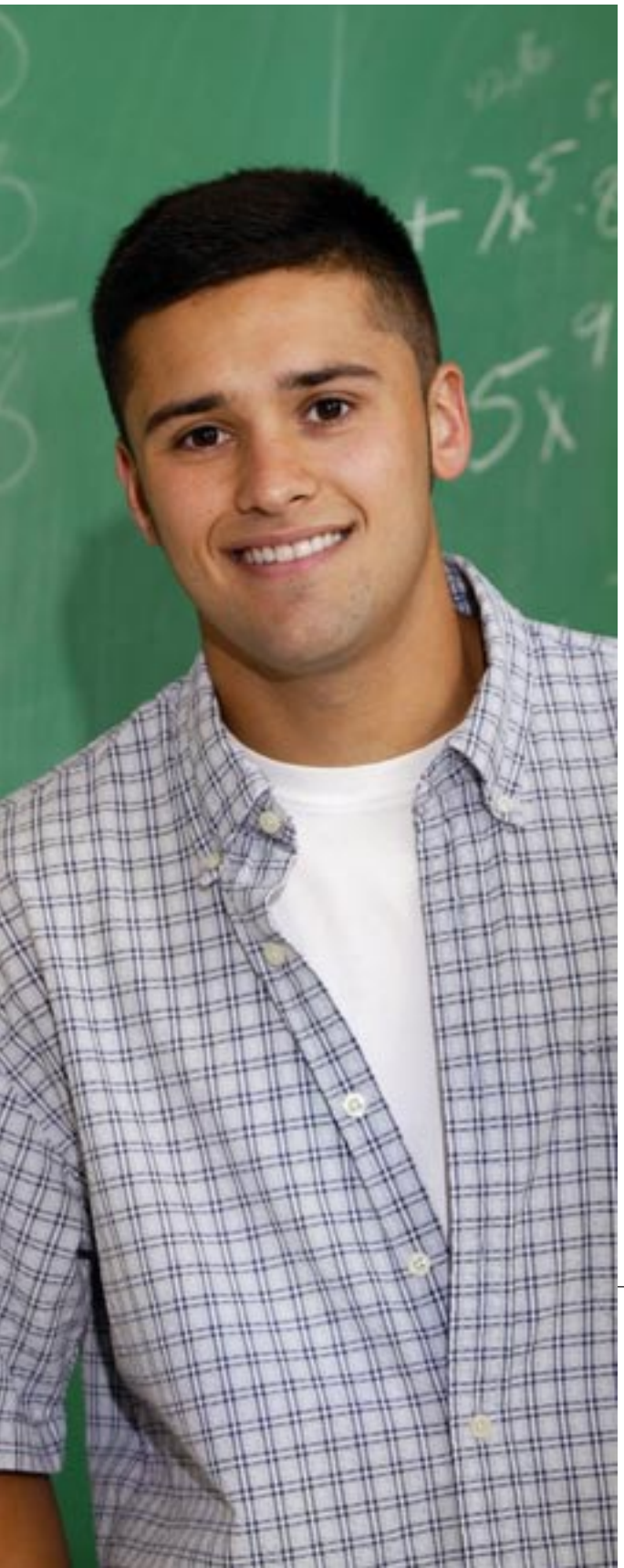

Measuring resilience and youth development: the psychometric properties of the Healthy Kids Survey

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Institute of Education Sciences
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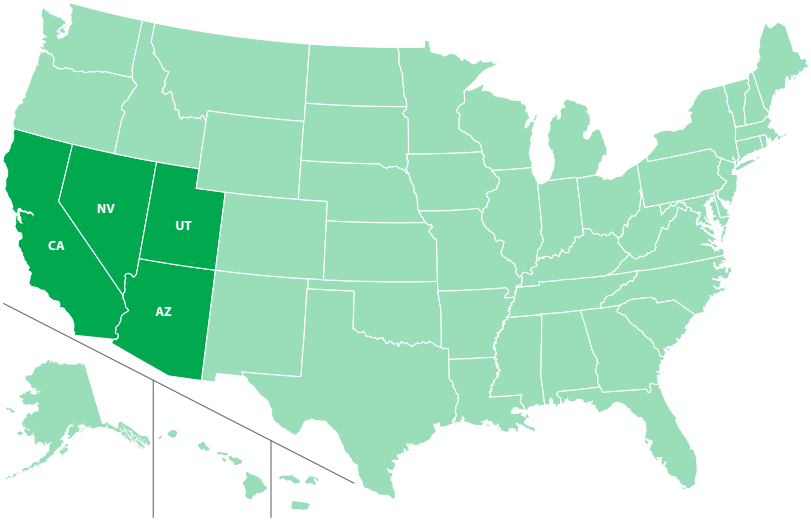

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September 2007

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This report is available on the regional educational laboratory web site at http://ies.ed.gov/ncee/edlabs.

Summary

Measuring resilience and youth development: the psychometric properties of the Healthy Kids Survey

This report summarizes findings from a study of the psychometric properties of the resilience and youth development module, a key component of the Healthy Kids Survey. The study aims to improve resilience assessment and research so that educators can shape the school environment to promote academic resilience.

The Healthy Kids Survey (HKS) is a comprehensive student self-report tool for monitoring the school environment and student health risks. This report focuses on one module of the survey, the resilience and youth development module (RYDM), which assesses environmental and internal assets associated with positive youth development and school success. Environmental assets refer to meaningful and pro-social bonding to community, school, family, and peers. Internal assets are personal resilience traits, such as self-efficacy and problem-solving skills

A part of the resilience and youth development module is administered to 600,000 students in California every year. School districts and schools, which receive both single-year prevalence data and trend data gathered by the module, use the data to evaluate their local programs and guide decisionmaking. The Healthy Kids Survey and the resilience and youth development module were designed as an epidemiological surveillance tool to track aggregate levels of health risk and resilience. The module increasingly is being used in evaluation work to assess student-level changes over time.

However, widespread use of the module, particularly for evaluation, may be premature. The psychometric properties of specific scales assessed by the elementary school module have yet to be established. The secondary school module has not been validated since 2000, when the instrument was first tested in the field. The instrument has since undergone several modifications, however, and must be revalidated. Moreover, measurement equivalence across different grades, males and females, and racial and ethnic groups has never been examined. Given California's diversity, demonstrating the cultural appropriateness of the module for different racial and ethnic groups is critical.

Using HKS data processed for school districts by WestEd's Health and Human Development Program, Regional Educational Laboratory West analyzed the module's psychometric properties. This report describes the results of this analysis, provides recommendations on the proper use of the instrument, and suggests modifications to the module.

For the secondary school module, the results are consistent with the instrument's current

use as an epidemiological tool and with its conceptual foundation. It provides comprehensive and balanced coverage of eight environmental resilience assets and four internal resilience assets; its subscales exhibit good internal consistency and are associated with student risk factors in expected ways. And if certain items are dropped, the module also demonstrates measurement equivalence across racial/ethnic groups, males and females, and grades. The secondary school RYDM scales exhibit low test-retest reliability, however, which suggests that the module is not well suited for examining student-level changes over time. The instrument was not designed to examine individual differences across students and should not be used this way. Moreover, two of the six internal assets that the secondary school module was designed to measure—cooperation and goals/aspirations—could not be assessed validly. Several measures would benefit if additional items were included in derived scales to increase domain coverage.

The elementary school module was designed to assess seven environmental resilience assets and three internal resilience assets, but it can reliably assess only two environmental assets and one internal asset. Most of the scales measured by the elementary school instrument have poor psychometric properties. The elementary school instrument should thus be modified considerably to make it suitable for research.

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This report summarizes findings from a study of the psychometric properties of the resilience and youth development module, a key component of the Healthy Kids Survey. The study aims to improve resilience assessment and research so that educators can shape the school environment to promote academic resilience.

WHY THIS STUDY?

As improvements to curriculum and instruction raise academic standards, researchers are looking more and more at what factors account for the varied influence of these improvements. Most have focused on risk factors for academic failure, such as poverty or racial and cultural minority status. But researchers are beginning to look at the other side of risk—resilience—and have identified several traits common to resilient youth that enable the youth to overcome barriers to academic success. There is little research, however, on how to measure these traits within the general student population and how to determine the role of the school environment in promoting these traits.

The Healthy Kids Survey (HKS) is one of the few large-scale surveys to assess both risk and resilience. The survey's resilience and youth development module (RYDM) is based on the premise that youth who experience high levels of environmental assets in three areas—high expectations from adults, caring relationships with adults, and opportunities for meaningful participation—will develop the resilience traits, the connection to school, and motivation to learn that lead to positive academic, social, and health outcomes (Constantine, Benard, & Diaz, 1999).

The resilience and youth development module—which has both elementary and secondary school versions—was designed as an epidemiological surveillance tool to track aggregate levels of protective factors. In California an average of about 600,000 students take the Healthy Kids Survey and a part of the resilience and youth development module every year. School districts and schools use the resulting prevalence and trend data to guide programmatic decisionmaking. With such widespread administration, school districts and independent evaluators are increasingly using the survey data to evaluate local programs by examining student-level changes over time. Capitalizing on the mandated administration of a standard instrument for local evaluation has the benefit of reducing the survey burden for students and

provides comparable outcome data across different program evaluations.

Widespread use of the module for research and local evaluation may be premature, however. The psychometric properties of specific scales assessed by the elementary school module have yet to be established. And the secondary school module has not been validated since 2000, when the instrument was first tested in the field. The instrument has since been modified several times, making validation of the current secondary school resilience and youth development module necessary. In addition, measurement equivalence across racial and ethnic groups, males and females, and different grades has never been systematically examined. The stakes are thus high to ensure that all parts of the module are valid and reliable.

To guide further improvements of this important assessment tool, Regional Educational Laboratory West conducted psychometric analyses of the properties of the resilience and youth development module, using a large set of recent survey data.[1] This report describes the results of these analyses, makes recommendations on the proper use of the module, and suggests modifications to improve the instrument.

For the secondary school module, the results are consistent with the instrument's current use as an epidemiological tool and with its conceptual foundation. It provides comprehensive and balanced coverage of eight environmental resilience assets and four internal resilience assets;[2] its subscales exhibit good internal consistency and are associated with student risk factors in expected ways. And if certain items are dropped, the module also demonstrates measurement equivalence across racial/ethnic groups, males and females, and grades. The secondary school RYDM scales exhibit low test-retest reliability, however, which suggests that the module is not well suited for examining student-level changes over time.

The resilience and youth development module assesses individual and environmental assets associated with positive youth development and school success

The instrument was not designed to examine individual differences across students and should not be used this way. Moreover, two of the six internal assets that the secondary school module was designed to measure—cooperation and goals/aspirations—could not be assessed validly. Several measures would benefit if additional items were included in derived scales to increase domain coverage.

The elementary school module was designed to assess seven environmental resilience assets and three internal resilience assets, but it can reliably assess only two environmental assets and one internal asset. Most of the scales measured by the elementary school instrument have poor psychometric properties. The elementary school instrument should thus be modified considerably to make it suitable for research.

DEVELOPING A RISK AND RESILIENCE ASSESSMENT TOOL

The Healthy Kids Survey is a comprehensive health risk and resilience data collection system that relies on student self-reporting. The survey's core module tracks health risks and problem behaviors that are significant barriers to learning among students. The resilience and youth development module assesses individual and environmental assets associated with positive youth development and school success. This section provides a brief background on how the survey and the resilience and youth development module were developed and are now used in California.

The Healthy Kids Survey—assessing risk and protective factors

The Healthy Kids Survey is the largest effort in the nation to require school districts to assess student resilience and risk behaviors (box 1). The California Department of Education requires all school districts with federal Title IV funding or with state Tobacco Use Prevention and Education grants to administer the survey every two years—the case

BOX 1

Specifications of the Healthy Kids Survey

Mandate
Mandated (since fall 2003) by the California Department of Education for compliance with No Child Left Behind and state Tobacco Use Prevention and Education (TUPE) grants

Survey type
- Comprehensive health risk and resilience survey
- Student self-report
- Anonymous, voluntary, confidential
- Modular secondary school instrument; single elementary school version

Grade levels
Grades 5, 7, 9, 11, and students in continuation schools

Sampling
Representative district sample; school-level surveys optional

Required modules (secondary school)
A. Core (required)
B. Resilience and youth development (school and community asset scales required)

Optional modules (secondary school)
B. Resilience and youth development (home, peer, and internal asset scales)
C. Safety (violence and suicide) and alcohol and other drug use
D. Tobacco
E. Physical health
F. Sexual behavior (pregnancy and HIV/AIDS risk)
G. Custom module (for adding questions)

Sources
Items based on the California Student Survey, Youth Risk Behavior Survey, and California Student Tobacco Use and Evaluation Survey

Requirements
- Biennial administration
- Module A and school & community asset scales in module B
- Module D by state TUPE grantees
- Written parental consent; passive consent optional since fall 2004
- Representative district samples

Administration
- By school, following detailed instructions
- Processing and reporting by WestEd's Health & Human Development Program

Product
Local reports and aggregated state database

for 85 percent of California school districts. In mandating the survey, the California Department of Education aims to promote accountability and data-driven decisionmaking and to improve health and prevention programs in schools.

The survey was developed in 1997 by WestEd's Health and Human Development Program in collaboration with Duerr Evaluation Resources and an advisory committee of researchers, teachers, prevention and health program practitioners, and public agency representatives. The California Department of Education funded the development of the survey in response to federal requirements that schools implement the Principles of Effectiveness—to collect and use data to assess student needs, justify program funding, guide program development, and monitor progress in achieving program goals. The immediate impetus for mandating the biennial administration of the survey, however, was meeting the requirements of the No Child Left Behind Act (Title IV—Safe and Drug-Free Schools and Communities Act).

The Healthy Kids Survey consists of a general core module, the resilience and youth development module, and four optional modules on specific risk behaviors. It can be customized to meet local needs:

- The required core module assesses demographic information and health risks relating to school violence, harassment, physical health, mental health, school-related behavior (such as truancy), and alcohol, tobacco, and other drug use.

- The resilience and youth development module assesses environmental factors (environmental assets) and individual traits (internal assets)

associated with academic performance, positive youth development, and protection from risky behaviors. The California Department of Education mandates that the sections on school and community assets be administered to all students who take the Healthy Kids Survey.

- Four optional, topical modules (and one customizable module) collect further detail on subjects covered by the core module, such as violence and alcohol and other drug use (module C); tobacco use and tobacco education (module D); physical activity and diet (module E); and sexual behavior, pregnancy, and HIV risk (module F).

- A custom module that allows schools to incorporate their own items.

The survey was designed as a district surveillance tool to provide prevalence estimates representative of students in the school districts that administer the survey rather than of students in the state as a whole. It was not designed to evaluate student-level changes over time or individual differences across students. The California Department of Education requires that districts administer the survey to 900 randomly selected students from each targeted grade (5, 7, 9, and 11). In districts with fewer than 900 students per grade (the case for 85 percent of California districts), all students in the targeted grades are surveyed. If a district has more than 10 schools per grade, at least 50 percent of schools are randomly sampled. (Los Angeles Unified School District has different requirements because of its size.)

Failing to find a survey that met its theoretical and psychometric criteria, the panel built on research to develop a theoretical framework that describes resilience factors and their interrelationships

WestEd's Health and Human Development Program provides school districts administering the survey with technical assistance and with a report on the district-level data collected in each module.

Although several adolescent behavior surveys, such as the Youth Risk Behavior Surveillance System, assess student risk factors and problem behavior, the Healthy Kids Survey's assessment of student supports, strengths, and competencies sets it apart. While some surveys incorporate protective factors, the resilience and youth development module is one of the few assessments that specifically addresses this dimension and does so with a strong theoretical foundation.

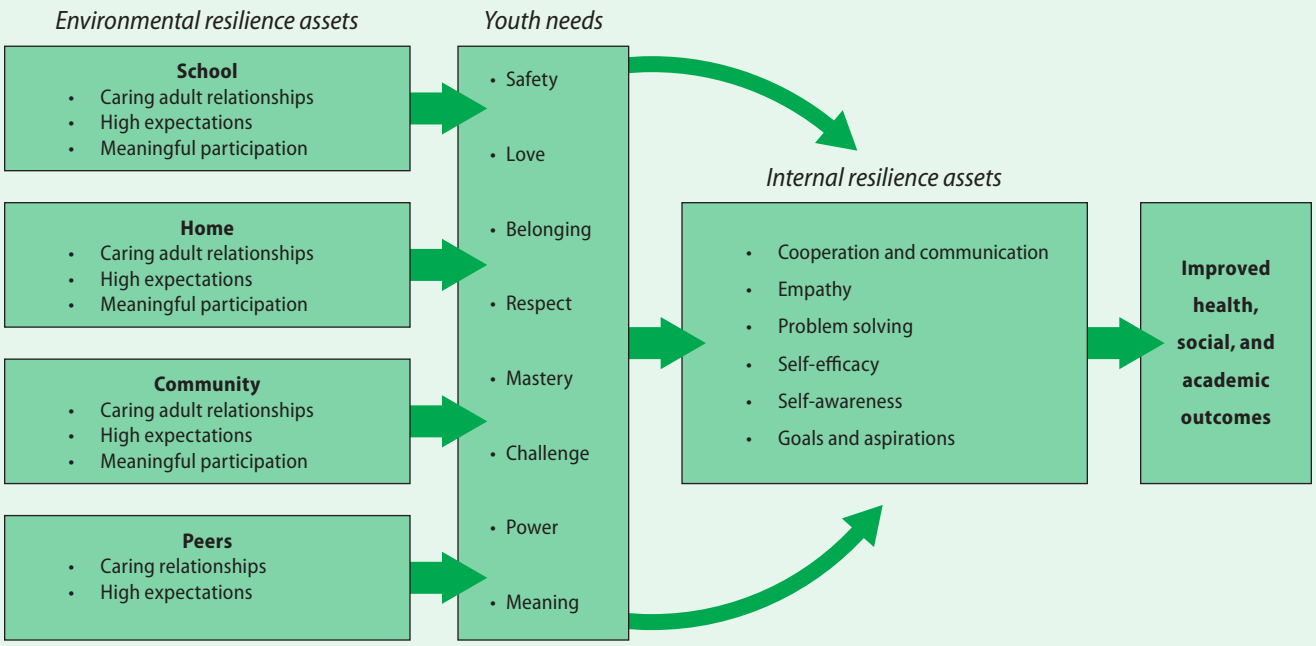
The resilience and youth development module—assessing the other side of risk

Secondary school module. In early 1998 the HKS Advisory Committee asked WestEd to develop a survey module to assess middle and high school student strengths, competencies, and positive social and health attitudes, feeling that the HKS core module did not give practitioners enough information about the factors behind positive development and school success (Constantine et al., 1999).

WestEd formed a Resilience Assessment Expert Panel to develop and validate a new survey module on youth resilience. The assessment needed to be brief enough to be widely administered along with the HKS core module; have a strong theoretical foundation; demonstrate reliability, validity, and cultural and developmental appropriateness when administered in California school settings; and provide a comprehensive, research-based assessment of environmental factors (environmental assets) and resilience traits (internal assets). Environmental assets refer to meaningful and prosocial bonding to community, school, family, and peers. Internal assets are personal resilience traits, such as self-efficacy and problem-solving skills (Benard, 1991, 1995, 2004).

Failing to find a survey that met its theoretical and psychometric criteria, the panel built on research on resilience and healthy human development systems—particularly the work of Benard (1991, 1995, 2004)—to develop a theoretical framework that describes resilience factors and their interrelationships (figure 1). The resulting module for secondary school students was designed to measure 11 environmental assets,

FIGURE 1
Conceptual model for the resilience and youth development module



asking students their perception of adult high expectations, their perceptions of caring relationships with adults, and their opportunities for meaningful participation in school, home, and community environments. The module also assesses caring relationships and high expectations in the peer domain. These external supports promote positive outcomes, discouraging risky behavior and stimulating academic success (Benard, 2004; Constantine et al., 1999; Hawkins, Catalano, & Miller, 1992; Masten & Coatsworth, 1998; Resnick et al., 2000; Rutter, 1987; Werner & Smith, 1982, 1992).

Internal resilience assets—the personal strengths of a resilient child—include social competence, problem solving, autonomy, and sense of purpose, which can each be broken down further (Benard, 1991, 2004). Social competence, for example, entails social communication skills, empathy and caring, and the ability to elicit positive responses from others (responsiveness) (Benard, 2004; Masten, 2001). Problem solving involves planning, flexibility, and resourcefulness; autonomy entails self-efficacy, self-awareness, and mindfulness; and sense of purpose includes goal direction, achievement motivation, optimism, and hope (Benard, 2004). Internal resilience assets develop both naturally and in response to environmental resilience assets. The resilience and youth development module was designed to measure six internal assets: empathy, problem solving, self-efficacy, self-awareness, cooperation and communication, and goals and aspirations.

A pool of 128 potential items was piloted in one middle and one high school in fall 1998. Researchers, classroom teachers, and other school practitioners helped select and modify items from the pool and revise the format and instructions. The first field test of the resilience and youth development module, with 92 resilience items, was administered to 1,000 high school students in three school districts in winter 1999. Cognitive processing interviews with students were also conducted to find out students' interpretation of the items. Based on analysis of the

TABLE 1

Items on the secondary school resilience and youth development module by construct, 2006/07

Construct	Item	Description
Environmental resilience assets		
School assets		
Caring relationships at school		At my school, there is a teacher or some other adult who. . .
SchlCare	R6	really cares about me.
	R8	notices when I'm not there.
	R10	listens to me when I have something to say.
High expectations at school		At my school, there is a teacher or some other adult who. . .
SchlHigh	R7	tells me when I do a good job.
	R9	always wants me to do my best.
	R11	believes that I will be a success.
Meaningful participation at school		At school. . .
SchlPart	R12	I do interesting activities.
	R13	I help decide things like class activities or rules.
	R14	I do things that make a difference.
Home assets		
Caring relationships at home		In my home, there is a parent or some other adult. . .
HomeCare	R49	who is interested in my schoolwork.
	R51	who talks with me about my problems.
	R53	who listens to me when I have something to say.
High expectations at home		In my home, there is a parent or some other adult. . .
HomeHigh	R48	who expects me to follow the rules.
	R50	who believes that I will be a success.
	R52	who always wants me to do my best.
Meaningful participation at home		At home. . .
HomePart	R54	I do fun things or go fun places with my parents or other adults.
	R55	I do things that make a difference.
	R56	I help make decisions with my family.
Community assets		
Caring relationships in community		Outside of my home and school, there is an adult. . .
ComCare	R15	who really cares about me.
	R17	who notices when I am upset about something.
	R20	whom I trust.
High expectations in community		Outside of my home and school, there is an adult. . .
ComHigh	R16	who tells me when I do a good job.
	R18	who believes that I will be a success.
	R19	who always wants me to do my best.
Meaningful participation in community		Outside of my home and school, I do these things. . .
ComPart	R21	I am part of clubs, sports teams, church/temple, or other group activities.
	R22	I am involved in music, art, literature, sports or a hobby.
	R23	I help other people.
Peer assets		
Caring relationships with peers		I have a friend about my own age. . .
PeerCare	R42	who really cares about me.
	R43	who talks with me about my problems.
	R44	who helps me when I'm having a hard time.
Pro-social peers		My friends. . .
PeerHigh	R45	get into a lot of trouble.
	R46	try to do what is right.
	R47	do well in school.

Construct	Item	Description
Internal resilience assets		
Cooperation and communication		How true do you feel these statements are about you personally?
Coop	R31	I can work with someone who has different opinions than mine.
	R36	I enjoy working together with other students my age.
	R37	I stand up for myself without putting others down.
Self-efficacy		How true do you feel these statements are about you personally?
SelfEff	R29	I can work out my problems.
	R30	I can do most things I try.
	R32	There are many things I do well.
Empathy		How true do you feel these statements are about you personally?
Empathy	R33	I feel bad when someone gets their feelings hurt.
	R34	I try to understand what other people go through.
	R38	I try to understand what other people feel and think.
Problem-solving		How true do you feel these statements are about you personally?
ProbSolv	R35	When I need help I find someone to talk with.
	R27	I know where to go for help with a problem.
	R28	I try to work out my problems by talking or writing about them.
Self-awareness		How true do you feel these statements are about you personally?
SelfAware	R39	There is a purpose to my life.
	R40	I understand my moods and feelings.
	R41	I understand why I do what I do.
Goals and aspirations		How true do you feel these statements are about you personally?
Goals	R24	I have goals and plans for the future.
	R25	I plan to graduate from high school.
	R26	I plan to go to college or some other school after high school.

Note: Possible responses include (1) not at all true, (2) a little true, (3) pretty much true, (4) very much true.

cognitive interview data, frequency distributions, and estimated Cronbach's alpha coefficients, the number of resilience items was reduced from 92 to 51 (table 1). In 2001 the resilience instrument was modified again, based on the results of grade-, gender-, and race/ethnic-specific exploratory factor analyses of data collected during the 1999/2000 academic year. The constructed resilience scales based on the 1999/2000 field test data form the basis of the current RYDM reports provided to school districts, even though the module has since been modified further.

Since 2003 all districts administering the Healthy Kids Survey must also administer the school and community asset parts of the module.[3] Thirty-five percent of districts choose to administer the full resilience and youth development module, reflecting widespread interest in assessing resilience. WestEd provides districts with the data for each scale and a report on the meaning and use of the data—and on how schools can create supportive learning environments that promote school connectedness and achievement. WestEd also provides state-level data to researchers and evaluators who apply for it.[4]

Elementary school module. Pools of resilience items were not independently developed for the elementary school module. They were selected from the secondary school module after focus groups with elementary school students. Initially, the elementary school module used the same constructs as the secondary school module, but with two items per construct instead of three. Analysis of the 1999 field test data and cognitive processing interviews with students suggested item deletions and changes in item wordings and response options. The final version has 21 items (table 2).

TABLE 2
Elementary school resilience and youth development module items by construct, 2006/07

Construct	Item	Description
Environmental resilience assets		
School assets		
Caring relationships at school	10	Do the teachers and other grown-ups at school care about you?
SchlCare	13	Do the teachers and other grown-ups at school listen when you have something to say?
High expectations at school	11	Do the teachers and other grown-ups at school tell you when you do a good job?
SchlHigh	14	Do the teachers and other grown-ups at school believe that you can do a good job?
Meaningful participation at school	9	Do you help make class rules or choose things to do at school?
SchlPart	15	Do you do things to be helpful at school?
Home assets		
Caring relationships at home	52	Does a parent or some other grown-up at home care about your schoolwork?
HomeCare	55	Does a parent or some other grown-up at home listen to you when you have something to say?
High expectations at home	53	Does a parent or some other grown-up at home believe that you can do a good job?
HomeHigh	54	Does a parent or some other grown-up at home want you to do your best?
Meaningful participation at home	56	Do you help out at home?
HomePart	57	Do you get to make rules or choose things to do at home?
Peer assets		
High expectations with peers	50	Do your best friends get into trouble?
PeerHigh	51	Do your best friends try to do the right thing?
Internal resilience assets		
Empathy	37	Do you try to understand how other people feel?
Empathy	38	Do you feel bad when someone gets their feelings hurt?
Problem-solving	39	Do you know where to go to get help with a problem?
ProbSolv	40	Do you try to work out your problems by talking or writing about them?
Goals and aspirations	41	Do you try to do your best?
Goals	42	Do you have goals and plans for the future?
	16	Do you plan to go to college or some other school after high school?

Note: Possible responses include (1) no, never, (2) yes, some of the time, (3) yes, most of the time, (4) yes, all of the time.

EVALUATING THE PSYCHOMETRIC PROPERTIES OF THE RESILIENCE AND YOUTH DEVELOPMENT MODULE

To better understand and improve the psychometric properties of the resilience and youth development module, this report analyzes local HKS data processed between 1998 and spring 2005, asking the following questions:

- How should school districts and local evaluators best use the module? Should the instrument be used exclusively to assess prevalence of environmental and internal assets or should it also be used to assess student-level changes across time?
- What are the psychometric properties of specific scales assessed by the secondary and elementary school resilience and youth development modules (including the dimensionality of scales, scale reliability, and construct validity)?
- Does the module exhibit measurement equivalence across racial and ethnic groups? In other words, is it culturally appropriate for different racial and ethnic groups? Does it exhibit measurement equivalence for males and females? Across different grades?
- What modifications should be made to improve the module?

BOX 2

Data and analytic strategies

The authors used the following data and analytic strategies to analyze the psychometric properties of the secondary and elementary school resilience and youth development modules.

Data

Two mutually exclusive analytic samples—a main sample and a validation sample—were drawn from an aggregate data file that included all HKS data processed between the spring 2003 and the spring 2005 administrations of the Healthy Kids Survey. For the secondary school analysis, separate samples were drawn for each grade (7, 9, and 11), gender, and ethnicity (Chinese American, African American, Mexican American, and white European American)—with 500 respondents randomly sampled per cell (12,000 total). Equal numbers were used for each gender and ethnic group so that models that do not adjust for gender and/or ethnicity would not be affected by gender/ethnic differences in the sample.

For the elementary school analysis, random samples of 1,000 males and 1,000 females (2,000 total) were drawn from the aggregated HKS data file. Thus, for the elementary school resilience and youth development module, only gender differences in measurement structure were examined. Respondents with missing data on more than half the resilience items were excluded from the analysis. For estimating models with missing data, maximum likelihood estimation with missing at random (MAR) assumptions were used, which assumes that values are missing at random conditional on the other observed items in the data (Little & Rubin, 2002; Muthén & Muthén, 2006).

Statewide data was supplemented with two sets of HKS data originally collected for local evaluation. Data collected in 2006 from a large urban school district in Southern California were used to describe the temporal stability of the derived scales (test-retest reliability). The elementary school Healthy Kids Survey and the secondary school core module and resilience and youth development module were administered two times in two weeks to 132 fifth-grade students and 90 ninth-grade students. Data collected in 2004/05 from students in a large county in Southern California were used to examine the relationship between the RYDM constructs and standardized test scores.

Exploratory and confirmatory factor analyses

Analyses were conducted to test empirically whether the factor structure of the resilience instrument is consistent with current usage and with its underlying conceptual model. For each sample and subsample (grade, gender, ethnicity), the measurement structure of the resilience instrument was established by fitting a series of exploratory and confirmatory factor analysis models. Exploratory factor analysis (EFA) models were estimated to determine roughly the number of factors underlying the data and the measurement structure of the latent factors. A combination of criteria was used to determine the number of factors to retain in the EFAs, including fit indices, scree plots, the number of eigenvalues greater than 1, conceptual clarity, and simplicity. Models with the fewest possible factors and models with no cross-loadings were favored over more complex models.

The results of the exploratory factor analysis models were then used as a starting point for a series of nested confirmatory factor analysis (CFA) models. Measures of model fit, correlations among the latent constructs (factors), and factor-loading patterns were used to make decisions about models. This process was replicated for each grade, gender, and ethnic group, and for the main sample and the validation sample.

To derive estimates for the EFA and CFA models, Muthén and Muthén's (2006) *Mplus* statistical modeling program was used. Because all the items used to measure resilience assets are ordinal, Muthén's (1984) approach to exploratory and confirmatory factor analysis with ordinal indicators was used.

Confirmatory factor analysis models with covariates

Measurement equivalence across demographic subgroups was examined by estimating confirmatory factor analysis models with covariates. MIMIC modeling—multiple indicator, multiple cause structural equation models—was used to test for differential item functioning across school grade, gender, and ethnicity. An applied strategy was used to

(CONTINUED)

BOX 2 (CONTINUED)

Data and analytic strategies

ascertain whether group differences in measurement intercepts have implications for evaluation research. Recommendations for item changes are made only when the measurement intercepts are substantively different across groups (± 0.20 standard deviations) in both the main sample and the validation sample.

Additional reliability and validity analyses

Internal consistency estimates of reliability of the derived scales were calculated using Cronbach's alpha for each grade, gender, and ethnic group in both the main sample and the validation sample. Nunnaly's (1978) criterion of 0.70 was used as the cutoff for determining acceptable internal consistency reliability for the secondary school survey. Because of the notoriously low internal consistency evident in surveys of elementary school students, this criterion was relaxed slightly to 0.60 for the elementary school module. To examine test-retest reliability, RYDM survey data collected from a small sample of fifth and ninth graders who took the resilience and youth development module twice in two weeks was used.

Differences in resilience scale scores across the demographic subgroups were also examined. To make demographic differences in the resilience scales more interpretable, effect sizes were calculated to represent the magnitude of such differences (Cohen, 1988). With two groups (male/female), the difference in scale means between each group was divided by the pooled standard deviation (Cohen's *d*). Thus the standardized difference represents the difference between each group in standard deviation units. With more than two groups (race/ethnicity), the standardized differences were represented by multiplying Cohen's *f* by 2—which is roughly equivalent to the standardized difference calculated for two groups when the number of observations in each cell is equal (Cohen, 1988).

Construct validity was assessed by examining the relationship of the derived resilience scales to other theoretically related constructs—including substance use, school violence, school-related behavior, and standardized test scores. To examine these relationships using a common metric, correlations between resilience constructs and criterion variables from confirmatory factor analysis models were estimated using the main and validation samples. Latent constructs represent continuous variables, while the criterion variables are either dichotomous or ordinal. Thus, polyserial correlations are presented, which represent the correlation between a continuous variable and a dichotomous or ordinal variable that reflects an underlying continuous variable (Bedrick & Breslin, 1996).

This report finds that both the secondary school and elementary school modules are used primarily to report aggregate data on prevalence and district-level changes across time. Although several modifications should be made, the RYDM scales are generally consistent with current use of the instruments and with the conceptual foundation of the module. (See box 2 and appendixes A and B for a discussion of the analytic strategy and the results of the analysis.)

Results of the analysis of the secondary school module

The secondary school module is a short instrument (51 items) suitable for widespread administration. It provides comprehensive and balanced coverage of both environmental (eight dimensions) and internal (four dimensions) resilience assets.[5] Its subscales exhibit good internal consistency and are associated with student risk factors in expected ways. If certain items are dropped, the module also demonstrates measurement equivalence across racial/ethnic groups, males and females, and grades.

The secondary school instrument is appropriate as an epidemiological tool, but is not well suited for evaluating student-level changes over time or individual differences across students. The instrument exhibits low test-retest reliability, suggesting that the RYDM constructs are temporally specific. Estimates of student-level changes across time are

likely to be imprecise because of the instability of the resilience measures. Even with low student-level stability, however, the module is valuable for tracking school and district prevalence estimates of resilience assets. Student-level errors in measurement likely cancel each other out when the data are aggregated at the school, district, and state levels.

The secondary school module contains eight internally consistent and valid measures of environmental resilience assets:

- Three measures representing supportive relationships in the school, community, and home environments. These supportive relationships include both caring relationships with and high expectations messages from adults. Only the measure for supportive relationships in the home environment, however, demonstrates sufficient test-retest reliability for use in research.

- Three measures of meaningful participation or involvement in relevant, engaging, and interesting activities with opportunities for responsibility and contribution in school, in the community, and at home.

- Two measures of environmental assets in the context of peers—caring relationships and high expectations (affiliation with pro-social peers).

That the scales for caring relationships and high expectations in the school environment turn out to measure the same factor is consistent with knowledge that has emerged since the resilience and youth development module was developed in the late 1990s. In focus groups conducted by HKS staff, when students were asked what they consider to be actions that reflect that a teacher "cares about you," they most often mentioned that the adult is a good listener, sets high standards, expects responsibility from the student, praises successes, and encourages the student through setbacks. Akey (2006) found that supportive teachers and clear, high expectations for behavior are key to developing both student engagement and perceived competence. Teachers whom students see as supportive and who set clear expectations for behavior create an atmosphere where students feel in control and confident about their ability to succeed in school. Akey's findings suggest that supportive teacher relationships, high academic expectations, and high-quality pedagogy combine to enhance student engagement and academic competence, which lead to higher achievement, consistent with the RYDM conceptual framework. The school and home supportive relationships measures, however, exhibit better psychometric qualities than many other instruments designed to measure similar constructs.

The secondary school instrument is appropriate as an epidemiological tool, but is not well suited for evaluating student-level changes over time or individual differences across students

Scores on four of the internal asset scales—self-efficacy, empathy, problem solving, and self-awareness—are internally consistent and adequate for general research purposes. But the RYDM items designed to measure cooperation and goals/aspirations do not, however, provide valid assessments of these constructs.

Although the consistency of the associations of environmental and internal resilience assets to other related constructs—such as substance use, school violence, school-related behavior, and standardized test scores—suggests that the measures demonstrate construct validity, the associations are weak. Thus the constructs exhibit only moderate construct validity.

Results of the analysis of the elementary school module

The elementary school resilience and youth development module uses 21 items to assess seven environmental assets and three internal assets. Reliably assessing so many factors with so few items is difficult, however, especially with a student

The elementary school module reliably assesses only two environmental asset measures and one internal asset measure, leaving considerable room for improvement

self-report instrument. Not surprisingly, the module reliably assesses only two environmental asset measures and one internal asset measure, leaving considerable room for improvement.

The elementary school module measures meaningful participation, pro-social peers, and supportive relationships in the school and home environments, but only the school supportive relationships and home supportive relationships scales exhibit sufficiently high internal consistency for further use. Only one reliable internal resilience asset measure was detected for elementary school students—empathy. The second factor detected, goals/aspirations, was not reliable enough to be recommended for further use. The third factor, problem solving, was not identified.

RECOMMENDATIONS

This report recommends that neither the secondary school nor the elementary school resilience and youth development module be used to evaluate student-level changes over time or individual differences across students. Estimates of student-level changes across time are likely to be imprecise because of the instability of the resilience measures. Other, longer, companion instruments should be developed to assess student-level changes. The resilience and youth development module is still useful as an epidemiological surveillance tool for reporting aggregate district-level data, however.

The following sections provide recommendations to drop or revise specific items in the module. Tables 3, 4, and 5 present the recommended measures. (See appendix tables B24, B25, B26, and B27 for a side-by-side comparison of the current and recommended measures.)

Secondary school environmental resilience assets

Recommendation 1—Combine the "caring relationships" and "high expectations" items. To maximize construct validity and reduce redundancy across scales, the "caring relationships" and "high expectations" items should be combined to form one scale representing "supportive relationships." Caring relationships and high expectations are indistinguishable as currently measured by the module. The new supportive relationships scale should continue to be assessed separately for school, community, and home environments.

Recommendation 2—Drop Item R23 ("I help other people"). This item should not be used to indicate community meaningful participation because the item functions differently, and thus has a different meaning, for females and Mexican American youth. A new item that taps involvement in activities in the community should be developed.

Recommendation 3—Drop Item R54 ("I do fun things or go fun places with my parents or other adults"). The item is not developmentally appropriate for older adolescents because 11th graders report substantially lower participation in such activities for a given level of home meaningful participation. This item distorts developmental trends on the home meaningful participation scale and should be dropped. A different item should be developed to replace it.

Recommendation 4—Drop item R45 ("My friends get into a lot of trouble"). Because it is a biased indicator of pro-social peers for females and Chinese American students, an alternative item should be developed to measure this construct.

Secondary school internal resilience assets

Recommendation 5—Drop the cooperation/communication construct. Two of the items used to measure cooperation/communication measure more than one construct: Items R36 ("I enjoy working together with other students my age") and R37 ("I stand up for myself without putting others down"). Item R31 ("I can work with someone who has different opinions than mine") should be moved to the self-efficacy scale. The measurement models suggest that this item

TABLE 3
Recommended measures of environmental resilience assets among secondary school students

Construct	Item
School support	Adult who really cares about me.
	Adult who notices when I'm not there.
	Adult who listens to me when I have something . . .
	Adult who tells me when I do a good job.
	Adult who always wants me to do my best.
	Adult who believes that I will be a success.
School meaningful participation	I do interesting activities.
	I help decide things like class activities or rules.
	I do things that make a difference.
Community support	Adult who really cares about me.
	Adult who notices when I am upset about . . .
	Adult whom I trust.
	Adult who tells me when I do a good job.
	Adult who believes that I will be a success.
	Adult who always wants me to do my best.
Community meaningful participation	I am part of clubs, sports teams, church/temple, or other . . .
	I am involved in taking lessons in music, art, literature . . .
Home support	Adult who is interested in my school work.
	Adult who talks with me about my problems.
	Adult who listens to me when I have something . . .
	Adult who expects me to follow the rules.
	Adult who believes that I will be a success.
	Adult who always wants me to do my best.
Home meaningful participation	I do things at home that make a difference.
	I help make decisions with my family.
Peer caring relationships	A friend who really cares about me.
	A friend who talks with me about my problems.
	A friend who helps me when I'm having a hard time.
Pro-social peers	My friends try to do what is right.
	My friends do well in school.

measures self-efficacy better than it does cooperation and communication.

Recommendation 6—Drop the goals and aspirations construct. Two of the three items used to measure this construct—R24 ("Goals and plans for the future") and R26 ("I plan to go to college or some other school after high school")—function differently across racial/ethnic groups.

Recommendation 7—Drop item R27 ("I know where to go for help with a problem"). As an indicator of problem solving, this item should be dropped because it functions differently for males and females. An alternative item should be developed to assess problem solving.

Elementary school environmental and internal assets

Recommendation 8—Develop more elementary resilience items. The elementary school resilience and youth development module tries to assess too many factors with too few items. Because having an elementary school resilience assessment that

TABLE 4
Recommended measures of internal resilience assets among secondary school students

Construct	Item
Self-efficacy	I can work with someone who has different opinions than mine.
	I can work out my problems.
	I can do most things if I try.
	There are many things that I do well.
Empathy	I feel bad when someone gets their feelings hurt.
	I try to understand what other people go through.
	I try to understand what other people feel and think.
Problem solving	When I need help I find someone to talk with.
	I try to work out problems by talking or writing about them.
Self-awareness	There is a purpose to my life.
	I understand my moods and feelings.
	I understand why I do what I do.

TABLE 5
Recommended measures of environmental and internal resilience assets among elementary school students

Construct	Item
Environmental resilience assets	
School support	Do the teachers . . . at school care about you?
	Teachers . . . listen when . . . have something to say?
	Teachers . . . tell you when you do a good job?
	Teachers . . . believe that you can do a good job?
Home support	Parent . . . care about your school work?
	Parent . . . listen when you have something to say?
	Parent . . . believe that you can do a good job?
	Parent . . . at home want you to do your best?
Internal resilience assets	
Empathy	Do you try to understand how other people feel?
	Do you feel bad when someone gets their feelings hurt?

is aligned with the secondary school module is important, additional resilience items should be developed for the elementary school survey. Each of the elementary school RYDM scales demonstrates inadequate domain coverage and marginal internal consistency, at least one additional item should be developed for each of the school supportive relationships, home supportive relationships, and empathy subscales. Two additional items should be developed for the meaningful participation at school and at home scales if it is retained in the survey.

Recommendation 9—Combine the "caring relationships" and "high expectations" items. As with the secondary school module, the "caring relationships" and "high expectations" items should be combined to form one scale representing "supportive relationships" in both the school environment and the home environment.

Recommendation 10—Drop meaningful participation. The meaningful participation scale should either be dropped or redeveloped because of low internal consistency. Moreover, item R15 ("Do you do things to be helpful at school?") should not be used to indicate meaningful participation because the item functions differently for males and females.

Recommendation 11—Drop pro-social peers. The pro-social peers scale should be dropped because one of the two items used to measure it functions differently for males and females. Perhaps items from other instruments that assess this construct should be used instead.

Recommendation 12—Drop goals and aspirations. The goals and aspirations scale should be dropped or modified because of its low internal consistency.

Recommendation 13—Develop a self-efficacy measure. Items should be developed to assess self-efficacy because this important construct is currently not assessed.