Chapter 2

Development and Standardization

Development of the DECA-C Items

Two approaches were used to develop the initial set of DECA-C items. First, the literature on resilience (e.g. Werner & Smith 1982, 1992) was carefully reviewed and behavioral descriptions of resilient children noted. In addition, focus groups with both preschool teachers and parents of preschoolers were conducted. In the focus group sessions, parents and teachers were asked to describe the behaviors of children who "were likely to do well" or that indicated that a child was "doing well" in regards to social and emotional health. Conversely, parents and teachers were also asked to describe behaviors that indicated a child was "likely to have problems." These behavioral descriptions were then used to generate rating scale items.

Second, items related to emotional and behavioral problems found in some preschool children were selected from the childhood age level of the *Devereux Scales of Mental Disorders* (DSMD) (Naglieri, LeBuffe and Pfeiffer, 1994). The content of the DSMD was derived primarily from the diagnostic criteria of the Diagnostic and Statistical Manual of the American Psychiatric Association - Fourth Edition (DSM-IV) (APA, 1994). These two complementary approaches ensured that the DECA-C would provide a balanced examination of each child's protective factors and behavioral concerns.

All the items were written to measure observable behaviors that require little or no inference on the part of the Rater. Careful attention was also paid to important psychometric qualities such as reliability and validity as well as ease of use of the scales. Throughout all phases of item development, the reading level of the items and rater directions were carefully considered so that the overall readability level of the text would be as low as possible.

The item development phase resulted in a pool of items, which served as the starting point in the construction of the DECA-C. A pilot study was con-

ducted in the spring of 1997 to examine the usefulness of the initial set of items and their inter-relationships. The results of the pilot study were used to create two forms, which were then used in the national standardization study. The first form (Form A) contained 53 items related to within-child protective factors in preschoolers. The second form (Form B) contained the same 53 protective factor items and an additional 77 items related to emotional and behavioral concerns found in some preschool children. These two different forms were developed because the DECA-C was standardized simultaneously with the DECA, which contains only protective factor items and a brief behavioral concern rating scale.

National Standardization

The DECA-C was standardized through a carefully prescribed method so that the sample would closely represent the United States population on salient dimensions. The data collection procedures also ensured that a wide variety of children were included for the generation of norms. Two samples were obtained, one for Form A and one for Form B. Both samples consisted of children aged 2 years 0 months to 5 years 11 months 30 days and were collected during the fall of 1997 and the spring of 1998.

Because both forms contained the protective factor items, both samples were used in the generation of norms for the protective factor scales. Therefore, the protective factor scales and norms are based on 2,000 children. This combined sample will subsequently be referred to as the "Protective Factors standardization sample." The behavioral concern items are found only on Form B. Therefore, the behavioral concern scales and norms are based on 1,108 children. This sample will subsequently be referred to as the "Behavioral Concerns standardization sample."

Ninety-five preschools and child care programs from across the United States participated in the standardization of the DECA-C. Teacher ratings were provided by the preschool teachers or child care staff at center based programs. Parent ratings were obtained not only from these same centers, but also in response to advertisements placed in parent magazines in Pittsburgh, PA; Atlanta, GA; Kansas City, KS; Phoenix, AZ; and Seattle, WA. To ensure the confidentiality of their responses, parents who chose to participate sent the com-

pleted rating forms directly to the Devereux Foundation Institute of Clinical Training and Research (ICTR). Teachers returned the completed forms in sealed envelopes to ICTR.

Representativeness of the DECA-C Protective Factors Standardization Sample

The DECA-C Protective Factors standardization sample is comprised of 2,000 preschool children. Teachers provided ratings on 1,017 of these children; parents provided ratings on the remaining 983 children. As shown below, the DECA-C Protective Factors standardization sample closely approximated the two- to five-year old population of the United States with respect to age, gender, geographic region of residence, race, ethnicity, and socioeconomic status. The desired characteristics of the standardization sample were based on the Statistical Abstract of the United States: 2001 published by the U.S. Bureau of the Census. In the tables that follow, the total numbers of children included may not sum to 2,000 due to missing data.

Age and Gender - The numbers and percentages of males and females at each age from 2 through 5 years are presented in Table 2.1.

The number of children at each age ranged from 370 to 624 (mean was 493.5). These results show that each age was well sampled. The data also show that the percentages of males and females in the standardization sample as a whole, as well as at each age, very closely approximated the proportions of the U.S. population.

Table 2.1

## DECA-C Protective Factors
Standardization Sample Characteristics

Age and Gender

	Males		Females		Total	
	n	%	n	%	n	%
2 year olds	219	51.3	208	48.7	427	21.6
3 year olds	322	51.6	302	48.4	624	31.6
4 year olds	272	49.2	281	50.8	553	28.0
5 year olds	195	52.7	175	47.3	370	18.7
Total Sample	1,008	51.1	966	48.9	1,974	
U.S. %[a]		51.1		48.9		

[a] The U. S. population data are based on the 1999 figures for 2- through 5-year olds only in "Resident Population, by Age and Sex: 1980 to 1999, Table No. 12," *Statistical Abstract of the United States: 2001 (121st edition): U.S.* Census Bureau, 2001.

Figure 2.1

DECA-C Standardization Sites
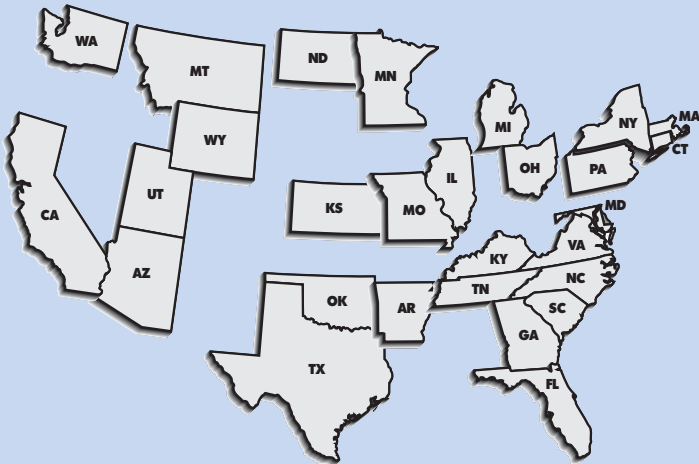
Geographic Region - Data were collected from 95 sites in 28 states in the four geographic regions: Northeast, Midwest, West, and South. Figure 2.1 indicates these sites by region.

Table 2.2 shows the numbers and percentages for each age and the total sample for each of the four geographic regions. These data show that the DECA-C Protective Factors standardization sample closely approximated the regional distribution of the U.S. population.

Race - Table 2.3 provides the DECA-C Protective Factors standardization sample composition by race and geographic region. Based on information provided on the rating forms, the children were classified according to five major race categories used by the U.S. Bureau of the Census: White, Black or African American, Asian or Pacific Islander, American Indian, and Other. The data in Table 2.3 indicate that the racial composition of the total standardization sample very closely approximated that of the U.S. population. Additionally, sample percentages within each region were also similar to the actual population percentages found in each geographic region.

Table 2.2

DECA-C Protective Factors
Standardization Sample Characteristics

Geographic Region and Age

	Northeast		Midwest		West		South		Total
	n	%	*n*	%	*n*	%	*n*	%	*n*
2 year olds	94	22.0	85	19.9	102	23.9	146	34.2	427
3 year olds	97	15.6	165	26.4	129	20.7	233	37.3	624
4 year olds	115	20.9	150	27.2	119	21.6	167	30.3	551
5 year olds	79	21.4	122	33.0	55	14.9	114	30.8	370
Total Sample	385	19.5	522	26.5	405	20.5	660	33.5	1,972
U.S. %[a]		18.5		22.4		24.5		34.6	

[a] The U. S. population data are based on "Resident Population, by Age and State: 2000, Table No. 20," *Statistical Abstract of the United States: 2001 (121st edition):* U.S. Census Bureau, 2001.

Table 2.3

DECA-C Protective Factors
Standardization Sample Characteristics

Race and Geographic Region

	White		Black		Asian or Pacific Islander		American Indian		Other		Total
	n	%	n	%	n	%	n	%	n	%	n
Northeast	244	63.5	67	17.4	15	3.9	1	0.3	57	14.8	384
Midwest	392	74.2	63	11.9	29	5.5	8	1.5	36	6.8	528
West	331	80.7	21	5.1	10	2.4	3	0.7	45	11.0	410
South	413	62.0	190	28.5	15	2.3	7	1.1	41	6.2	666
Total	1,380	69.4	341	17.2	69	3.5	19	1.0	179	9.0	1,988
U.S. %[a]		67.0		14.6		3.7		1.1		13.5	

[a] The U. S. population data are for children under the age of five in *Census 2000 PHC-T-9. Population by Age, Sex, Race and Hispanic or Latino Origin for the United States: 2000. www.census.gov*

Ethnicity - The proportions of children of Hispanic origin included in the DECA-C Protective Factors standardization sample are presented in Table 2.4. These data, based on the number of participants who reported Hispanic ethnicity, show that the composition of the standardization sample approximated that of the U.S. population.

Socioeconomic Status - Socioeconomic status of the DECA-C Protective Factors standardization sample was assessed by determining the number of children receiving either subsidized day care or public assistance. Of the entire sample of 2,000 children, 493 (24.65%) were either receiving subsidized day care or public assistance. This very closely approximates the 25% of preschool children living in poverty (Children's Defense Fund, 1998).

Representativeness of the DECA-C Behavioral Concerns Standardization Sample

The behavioral concerns scales were standardized on a sample of 1,108 preschool children (2 years 0 months through 5 years 11 months 30 days) who

Table 2.4

DECA-C Protective Factors
Standardization Sample Characteristics

Hispanic Ethnicity and Geographic Region

	Hispanic		Non-Hispanic		Total
	n	%	n	%	n
Northeast	59	15.7	317	84.3	376
Midwest	24	4.7	487	95.3	511
West	49	12.2	351	87.8	400
South	74	11.6	565	88.4	639
Total	206	10.7	1,720	89.3	1,926
U.S. %[a]		19.4		80.6	

[a] The U.S. population data are based on children under the age of five in *Census 2000 PHC-T-9. Population by Age, Sex, Race and Hispanic or Latino Origin for the United States: 2000. www.census.gov*

were rated on Form B of the DECA. These children were rated by parents ($n = 541$) or teachers ($n = 567$). The sample is described in the following sections.

Age and Gender - The numbers and percentages of males and females at each age from 2 through 5 years are presented in Table 2.5. The average number of children at each age across the groups was 274, ranging from 200 to 351. These results show that each age was well sampled. The data also show that the percentages of males and females in the DECA-C Behavioral Concerns standardization sample as a whole, as well as at each age, closely approximated the proportions of the U.S. population.

Table 2.5

DECA-C Behavioral Concerns
Standardization Sample Characteristics

Age and Gender

	Males		Females		Total	
	n	%	n	%	n	%
2 year olds	128	51.4	121	48.6	249	22.7
3 year olds	189	53.8	162	46.2	351	32.0
4 year olds	140	47.3	156	52.7	296	27.0
5 year olds	105	52.5	95	47.5	200	18.2
Total Sample	562	51.3	534	48.7	1,096	
U.S. %[a]		51.1		48.9		

[a] The U.S. population data are based on the 1999 figures for 2 to 5-year olds only in "Resident Population, by Age and Sex: 1980 to 1999, Table No. 12," *Statistical Abstract of the United States: 2001 (121st edition):* U.S. Census Bureau, 2001.

Table 2.6

DECA-C Behavioral Concerns
Standardization Sample Characteristics

Geographic Region and Age

	Northeast		Midwest		West		South		Total
	n	%	n	%	n	%	n	%	n
2 year olds	79	31.9	73	29.4	46	18.5	50	20.2	248
3 year olds	74	21.1	101	28.9	71	20.3	104	29.7	350
4 year olds	80	27.1	79	26.8	60	20.3	76	25.8	295
5 year olds	63	31.5	57	28.5	36	18.0	44	22.0	200
Total Sample	296	27.1	310	28.4	213	19.5	274	25.1	1,093
U.S. %[a]		17.7		22.7		23.9		35.7	

[a] The U. S. population data are based on "Resident Population, by Age and State: 2000, Table No. 20," *Statistical Abstract of the United States: 2001 (121st edition):* U.S. Census Bureau, 2001.

Geographic Region - Data were collected from the same sites as the DECA-C Protective Factors standardization sample and as indicated in Figure 2.1 above. Table 2.6 shows the numbers and percentages for each age and the total sample for each of the four geographic regions. These data show that the DECA-C Behavioral Concerns standardization sample was similar to the U.S. population in terms of regional distribution.

Race - Table 2.7 provides the DECA-C Behavioral Concerns standardization sample composition by race and geographic region. Based on information provided on the rating forms, the children were classified according to five race categories used by the U.S. Census Bureau: White, Black or African American, Asian or Pacific Islander, American Indian, and Other. The data in Table 2.7 indicate that the racial composition of the DECA-C Behavioral Concerns standardization sample approximated that of the U.S. population. Additionally, sample percentages within each geographic region were similar to the U.S. population percentages found in each geographic region.

Table 2.7

DECA-C Behavioral Concerns
Standardization Sample Characteristics

Race and Geographic Region

	White		Black		Asian or Pacific Islander		American Indian		Other		Total
	n	%	n	%	n	%	n	%	n	%	n
Northeast	216	73.0	25	8.4	11	3.7	1	0.3	43	14.5	296
Midwest	256	82.1	30	9.6	4	1.3	3	1.0	19	6.1	312
West	173	80.5	15	7.0	6	2.8	3	1.4	18	8.4	215
South	161	58.3	102	37.0	0	0.0	3	1.1	10	3.6	276
Total	806	73.3	172	15.7	21	1.9	10	0.9	90	8.2	1,099
U.S. %[a]		67.0		14.6		3.7		1.1		13.5	

[a] The U.S. population data are for children under the age of five in *Census 2000 PHC-T-9. Population by Age, Sex, Race and Hispanic or Latino Origin for the United States:2000. www.census.gov*

Table 2.8						
DECA-C Behavioral Concerns **Standardization Sample Characteristics**						
Hispanic Ethnicity and Geographic Region						
	Hispanic		**Non-Hispanic**		**Total**	
	n	**%**	*n*	**%**	*n*	
Northeast	40	13.8	250	86.2	290	
Midwest	13	4.4	285	95.6	298	
West	23	11.1	184	88.9	207	
South	21	8.2	236	91.8	257	
Total	97	9.2	955	90.8	1,052	
U.S. %[a]		19.4		80.6		

[a] The U.S. population data are based on children under the age of five in *Census 2000 PHC-T-9. Population by Age, Sex, Race and Hispanic or Latino Origin for the United States: 2000. www.census.gov*

Ethnicity - The proportions of children of Hispanic origin included in the DECA-C Behavioral Concerns standardization sample are presented in Table 2.8. These data, based on the number of participants who reported Hispanic Ethnicity, show that the composition of this sample approximated that of the U.S. population.

Socioeconomic Status - The socioeconomic status of the DECA-C Behavioral Concerns standardization sample was assessed by determining the number of children receiving either subsidized child care or public assistance. Of the entire sample of 1,108 children, 281 (25.4%) were either receiving subsidized child care or public assistance. This very closely approximates the 25% of preschool children living in poverty (Children's Defense Fund, 1998).

Organization of DECA-C Items into Scales

Utilizing both standardization data sets, DECA-C items were organized into statistically and logically derived scales. The protective factor and behavioral concern scales were identified using item factor analysis. A series of analyses were conducted to determine the most interpretable, parsimonious, and

defensible factor solution. To achieve this goal items were deleted from the larger pool of items used during standardization based on the following goals: 1) to identify the best factor solution from psychometric and interpretability perspectives, 2) to shorten the DECA-C as much as possible without compromising breadth of coverage, and 3) to ensure that the constructs are measured reliably by the scales.

The individual DECA-C item factor loadings were obtained using principal factor analysis with varimax rotation. These results showed that each of the factors that would become the scales of the DECA-C was comprised of items with substantial loadings on the scale on which they were placed. Only a small number of items had lower secondary loadings on a different factor, illustrating the strength of the findings. The final results suggested that three factors best described the protective factor data (labeled Initiative, Self-control, and Attachment) and four factors best described the behavioral concern data (labeled Withdrawal/Depression, Emotional Control Problems, Attention Problems, and Aggression).

Norming Procedures - The first step in preparation of the norms was to determine if any trends existed in the data. The children's Total Protective Factors and Total Behavioral Concerns Scale raw scores were examined for age, rater, and gender differences. Results of these analyses indicated that the scores did not show age-related changes across the 2- through 5-year age span, therefore, the norms were constructed for all ages combined. The lack of age trends in the data was further explored in a subsequent study. The findings of this study indicated that although there are differences in the specific forms of behaviors measured by the DECA-C items across the 2- to 5-year age span, there were not differences in the frequency of these behaviors, which is what the scale measures. For example, a two-year old may calm himself down by holding a teddy bear and sucking his thumb, as compared to a five-year old who may calm herself down by talking to an adult, but both two- and five- year olds engage in these different behaviors with the same frequency. The DECA-C does not assess the form of the behavior, only the frequency of its occurrence, which, in fact, did not differ across the two- to five-year age range.

Separate norms by Rater (Parent or Teacher) were prepared because of the different environments in which the children are seen by the different raters.

Gender differences, which reflect real disparities in how boys and girls behave, were indicated by mean score differences. To preserve these findings, one set of norms was constructed based on the combined data from both genders. (Having separate norms by gender would have removed these differences.)

After determining that norms would be constructed by rater, the distributions of raw scores were examined for normality. The cumulative frequency distributions for the factorially derived scales all approached normality but were slightly positively skewed. For this reason, it was decided that norms would be computed using normalization procedures. This was accomplished by fitting the obtained frequency distribution for each scale to normal probability standard scores via the obtained percentile ranks. Minor irregularities in raw score to standard score progressions were eliminated by smoothing. These procedures were followed for all the protective factors and behavioral concerns scales.

T-Scores

Standard scores for the DECA-C were computed separately for the seven scales (Initiative, Self-control, Attachment, Withdrawal/Depression, Emotional Control Problems, Attention Problems, and Aggression) and for the Total Protective Factors and Total Behavioral Concerns Scales. The *T*-scores were all based on separate raw score distributions. The standard scores corresponding to the percentiles for which they are theoretically associated, based on the normal curve, were obtained. *T*-scores for each scale were set at a mean of 50 and a standard deviation of 10. This metric was selected because of its familiarity to professionals and because it facilitates interpretation of the results and comparison to scores from other similar scales.