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California Child and Youth Well-Being Index, 1995-2007: METHODOLOGY

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DATA AND METHODS

Data Selection, Imputation and Smoothing

The construction of the Child and Youth Well-Being Indices for this project began with a review of more than 250 child and youth-related indicators acquired from the Kidsdata.org database, which at the time focused only on the San Francisco Bay Area. The vast majority of these indicators are available for only one or two years. A few are in the form of statistical time series with repeated measurements over several years. The earliest year for most of the indicator time series is 1997 and most end in 2003, while a few date back to earlier years and/or extend up to 2007. We set 1995 as the target base year and our goal was to track the trends up to 2007 (or 2006 when 2007 data were not available). We then *selected indicators* whose time series started as late as 1997 and ended at least 2003 *and* had at least three data points over the period.

We identified 16 Key Indicators that met these selection criteria. Table 1 (at the end of this report) contains a list of the Key Indicators, gives brief definitions of each, identifies the age groups on which they are defined, and indicates whether or not data on the indicators used herein can be disaggregated by sex and race/ethnicity.[1] Numerical values for these Key Indicators are based on data from general population surveys conducted by the Census Bureau and the State of California, and Vital Statistics reports to the state and the National Center for Health Statistics. The selected Key Indicators either measure well-being outcomes or are surrogates thereof. The

[1] As Land, Lamb, and Mustillo (2001) showed, conclusions about trends in child well-being can depend on the specific indicators and domains used in the composition of the summary indices. Thus, this study based on 16 indicators has bounded generalizability in that its conclusions could be altered when data for a more comprehensive set of indicators become available for study. Our prior experience gives us confidence, however, that the indicators and methodology used herein can capture major trends up or down in child well-being.

focal age groups for the Key Indicators are the childhood and adolescent ages, generally bounded by ages 0 to 17 at last birthday. In the case of the child/youth death rate and the youth suicide rate, the upper age bound extends to 24. This is greater than age 18, but the larger age bound is constrained by available data. In addition, a principal focus of this study is on trends over time, and the temporal trend for the larger age group is similar to what would be observed if it were possible to include data only up to age 18.

Because the Key Indicators in Table 1 come from extant sample survey and vital statistics data sources, most of them are focused on the incidence or prevalence of ill-being outcomes as contrasted to positive well-being outcomes. The field of child well-being studies has taken note of this and efforts are under way to create data series on direct measures of children's satisfaction, friendships, or quality of family relations. This is also happening for data sources on child well-being in California, the Bay Area, and Los Angeles County. Unfortunately, these recent efforts typically have only produced measurements at one or two time points, and the focus of the present study is on changes in well-being from 1995 to 2007. In addition, it should be noted that the Land et al. (2007) study found a generally positive relationship between changes in the U.S. national CWI and those of a continuous series of sample survey data on responses of High School Seniors (typically age 17) to a life satisfaction question. The present study builds on the national CWI studies, using a similar methodology for studying changes over time, and makes comparisons of the trends among the State of California, the Bay Area, and Los Angeles County with those of the U.S. as a whole. The trends reported herein, while not based on as many indicators of positive well-being as desirable, likely are indicative generally of trends that would be identified with more comprehensive data series.

Since all of the Key Indicators did not have complete time series data points between 1995 and 2007, missing data were *imputed* at various points of the time series. For the Key Indicators for which statewide values were available but not for the counties, values for the counties were calculated using the ratio of the rates for the counties to the state in one or more preceding years (e.g., the rate of children in poverty, and juvenile felony drug and alcohol arrest rate). For years when both state and county-wide values were not available, missing values were imputed by averaging the values of two adjacent years (e.g., children with access to child care).

Some of the Key Indicator series were subjected to *data smoothing* procedures in order to extract underlying trends independently from stochastic variation from year to year. Such "statistical noise" is particularly large in less populated counties with relatively small numbers of children and youths, and in data disaggregated by gender and race/ethnicity. After careful examination of the movement of each Key Indicator, the whole or partial time series were smoothed by taking three-year moving averages for the counties for which stochastic variation in the data was severe. When the base year rate also showed evidence of being unduly influenced by stochastic variation – that is, the base year value is either too low or too high compared to the overall trend – the base year value was adjusted by taking an average with subsequent year values. Where necessary, data smoothing was conducted more than one time (e.g., self-inflicted injury hospitalization rate).[2]

Each Key Indicator then was assigned to one of five domains of child and youth well-being: family economic well-being, health, safety/behavioral concerns, educational attainment, and emotional well-being (Table 1). As Land et al. (2001) note, these domains – or similar domains with different names – have been well-established in numerous subjective well-being

[2] For details on the imputation and smoothing procedures applied, Excel datasheets with all data series and notes on their construction are available from the authors on request.

studies over the past three decades. The literature reviews by Cummins (1996; 1997) of 27 subjective well-being studies found, for example, that there is a relative small number of domains that comprise most of the subject areas that have been studied, such as material/economic well-being, productive activity, health, safety, place in community, intimacy, and emotional well-being. These domains of well-being recur again and again whether the study uses informal focus group discussions or sample survey questionnaires, and for population groups ranging from national sample surveys to clinical samples, and across age groups from children to adults.

Calculating domain-specific indices allows us to evaluate the trends by the areas of concern and disaggregate the effect of each domain on composite indices. Some Key Indicators tap into phenomena that could be categorized into more than one well-being domain, but for purposes of composite index construction, they were counted only once in the domain to which they were assigned. Compared with the national CWI's seven domains (Land et al. 2001, 2007), our five domains do not include the social relationships and community connectedness domains due to the unavailability of relevant indicators. For the same reason, the emotional well-being domain does not include indicators relating to spiritual well-being unlike the emotional/spiritual domain in the original CWI.[3]

Index Calculation Procedures

To calculate the CWI, each of the 16 time series of the Key Indicators was indexed by the base year (1995). The base year value of the indicator was assigned a value of 100 and subsequent values of the indicator were taken as percentage changes in the index from the base

[3] For details on the definitions, units, and data sources of the Key Indicators used in this study, the Kidsdata.org website (http://www.kidsdata.org/) may be consulted.

year value. The directions of the indicators are oriented so that a value greater than 100 in subsequent years means that the social condition measured has improved and a value less than 100 indicates the well-being measured has deteriorated.

The 16 indexed Key Indicator time series were grouped into the five domains of well-being, and domain-specific CWI values were computed for each year by *equal weighting*. Statistical properties of the equal weighting procedure for the construction of composite quality of life indices were studied by Hagerty and Land (2007), who showed, using a mathematical model of composite indices in the presence of heterogeneous importance ratings among individuals for the component indicators, that the equal weighting method is what is termed a *minimax estimator* in statistics, in the sense that this method minimizes the likelihood of extreme or maximal disagreements among individuals on the composite index. In addition, Hagerty and Land stated and proved mathematically a number of theorems that define the conditions under which there will be agreement or disagreement among individuals with respect to rankings of units of analysis (e.g., sub-population groups, regions, countries) by quality of life in cross-section studies as well as on the direction of temporal changes in quality of life in over-time studies. They also reported on the results of a number of simulation studies of alternative weighting schemes and showed that intuition greatly underestimates the extent of agreement on rankings of units by quality of life in cross-section studies as well as on the direction of temporal changes in quality of life in over-time studies. Given the existence of this study, we do not engage in further methodological analyses in the present article. Rather, we adopt the equal weighting strategy and focus on the resulting substantive findings.

The annual *domain-specific CWI values* were computed until 2006 or 2007, depending on whether the last year data are available for the entire component indicators within the domain.

As a result, indices for the economic well-being and safety/behavioral concerns domains were computed to 2007, while the other three domain-specific indices end in 2006. The five domain-specific indices were then aggregated into an equally weighted composite CWI for each year.

Since only two domain-specific indices were available for 2007, the composite CWI for each county was calculated between 1995 and 2006. For the Bay area, these composite indices for each county were then grouped into an overall composite CWI value. Domain-specific indices for the Bay Area were also computed by equally averaging the corresponding county-specific domain indices. The Los Angeles County and statewide composite CWIs were also calculated in the same way for comparison with the Bay Area.

Gender- and race/ethnic-specific CWIs were computed following the same procedures as the overall CWI. Composite indices were calculated separately for males and females. Also, four race/ethnic groups were examined: African American, Asian, Latino, and Caucasian. Since 2000, health-related data in California have distinguished Pacific Islanders from Asians and multiracial groups from Caucasians. Any inconsistency before and after the year 2000 due to these categorical changes was not adjusted due to lack of available data. Thus, Asian and Caucasians categories from 1995 to 1999 include, respectively, Pacific Islanders and multiracial groups.

The limited availability of group-specific time series data necessitated the exclusion of some of the Key Indicators in calculating group-specific CWIs by gender or racial/ethnic groups (e.g., juvenile felony drug and alcohol arrest rate and children with access to child care) or the replacement of group-specific indices with overall indices (e.g., juvenile felony rate for race/ethnic CWIs). Both indicators in the economic well-being domains lack data disaggregated by gender or race/ethnicity, thus overall domain-specific indices were used in computing group-

specific CWIs. Group-specific values fluctuate more than overall population values since the former have much smaller denominators than the latter, leading us to apply more extensive smoothing procedures.

Disparity in child and youth well-being among gender and race/ethnic groups was examined using the methodology developed by Hernandez and Macartney (2008), who showed how to calculate a *Disparity Index* in two steps. First, the percentage difference between each subgroup and the total population is computed, such as girls compared with the total population and boys compared with the total population. The overall population value of each indicator is assigned a value of 100 for each year, and a subgroup-specific value for the year is taken as the percentage of the population value. For example, if the value for girls is 10 percent higher in 1995 than for the population as a whole, a value of 110 would be assigned for that year to show the gap in well-being between girls and the total population. Likewise, a value of 95 would be given if the value for boys is 5 percent lower than for the population. A race/ethnic subgroup-specific value for each year was also calculated in the same way as a percentage of the total population value. For instance, if the value for Latinos is 8 percent higher in 2007 than for the population as a whole, a value of 108 would be given for Latinos for that year. Similarly, a value of 90 would be assigned to Caucasians if their value is 10 percent lower than for the total population. Second, the difference among subgroups in the indexed values was calculated as the Disparity Index over time. For gender, girls' indexed value was used as the base, and boys' values were compared to those of girls. A positive Disparity Index indicates girls do better or have an advantage over boys, and a negative Disparity Index indicates boys do better or have an advantage over girls. In the example above, the calculated gender Disparity Index of 15 points, means girls have a 15-point advantage over boys.

For race/ethnicity, we used Caucasians as the reference group for cross-subgroup comparisons. In other words, African American, Asian, and Latino children were each compared to their Caucasian peers. A positive Latino-Caucasian Disparity Index, for example, means Latino children do better or have an advantage over Caucasian children. In the aforementioned case, the computed Latino-Caucasian Disparity CWI, 18 points, indicates Latinos do better than their Caucasian peers by that amount.

As with the composite CWI, Disparity CWIs for each Key Indicator were aggregated into domain-specific Disparity Indices, and the composite Disparity CWI was calculated by averaging the equally-weighted domain Disparity Indices. To extract actual trends, the indices were subjected to data smoothing procedures with three-year moving averages. In both gender- and race/ethic-specific Disparity CWIs, only three domains – health, educational attainment, and emotional well-being – were considered due to the lack of group-specific data for the economic well-being and safety/behavioral concerns domains.

Projections Procedures

To anticipate the effects of the economic downturn on child well-being, we used trends in unemployment in California to project economic trends, in particular child poverty rates, in the State of California, the Bay Area, and Los Angeles County.[4] Information was available on current and forecasted unemployment trends for the State of California. The patterning of the projected unemployment trends was used to project California child poverty trends to the year 2012 using the share-of-growth procedure.[5] The average annual difference between California's

[4] The other economic indicator, housing affordability, displays trends that are more variable and affected by a number of factors besides family income. Accordingly, we did not develop projections for this indicator.
[5] For details on the calculation procedures and accompanying Excel file on projection calculations, please contact the authors.

unemployment rate and child poverty rate for the years 1993 to 2008 was used with the forecasted unemployment rates to project the child poverty rate for the years 2009 to 2012 for the State of California.

As there were no official projections of unemployment for the Bay Area or Los Angeles County, a conventional method for demographic projections for local areas within states was used to project child poverty rates in those areas. Specifically, a constant-share projection method (Smith, Tayman, and Swanson 2001) was used in which the average difference between the annual child poverty trends of California and a region (e.g., the Bay Area) was used to project that region's trends for 2008 to 2012. To check for possible historical period effects due to periods of economic change, four time periods of region-California differences were used to project the regional child poverty trends: 1993-2007 ("overall"); 1993-1997; 1998-2002; and 2003-2007.

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Table 1. Sixteen Key Indicators of Child and Youth Well-Being in the San Francisco Bay Area, Los Angeles County, and the State of California

Domain	Indicator	Definition	Age Group	Indicator Can Be Disaggregated By:	
				Sex	Race/Ethnicity
Family economic well–being domain:	Children in poverty	Percentage of children ages 0 – 17 in households earning less than the federal poverty level	0–17	No	No
	Households that can afford to purchase a median–priced home	Percentage of households that can afford to purchase a median–priced home	Not Applicable	No	No
Health domain:	Infant mortality rate	Number of deaths per 1,000 live births.	0–1	Yes	Yes
	Infants born at low birth weight	Percentage of infants born at low birth weight, which is defined as less than 2500 grams	0	Yes	Yes
	Child/youth death rate	Number of deaths per 100,000 children/youth ages 1 – 24	1–24	Yes	Yes
	Injury hospitalization rate	Number of non–fatal injury hospitalizations per 100,000 children/youth ages 0–20	0–20	Yes	Yes
	Asthma hospitalization rate	Number of asthma hospitalizations per 1,000 individuals at ages 0–14	0–14	Yes	Yes
	Women receiving prenatal care in the first trimester	Percentage of women who receive prenatal care in the first trimester of pregnancy	Not Applicable	Yes	Yes

Table 1 (continued). Sixteen Key Indicators of Child and Youth Well-Being in the San Francisco Bay Area, Los Angeles County, and the State of California

Domain	Indicator	Definition	Age Group	Indicator Can Be Disaggregated By:	
				Sex	Race/Ethnicity
Safety/behavioral concerns domain:	Teen birth rate	Number of births per 1,000 girls ages 15–19	15–19	N.A.	Yes
	Juvenile felony arrest rate	Number of juvenile felony arrests per 1,000 youth ages 10–17	10–17	Yes	No
	Juvenile felony drug and alcohol arrest rate	Number of juvenile felony drug and alcohol arrests per 1,000 youth ages 10–17	10–17	No	No
Educational attainment:	High school graduates completing college preparatory courses	Percentage of public school 12th grade graduates completing courses required for University of California (UC) and/or California State University (CSU) entrance, with a grade of "C" or better	17	Yes	Yes
	High school dropouts	Estimated percentage of public high school students who drop out of high school, by race/ethnicity, according to the four–year derived dropout rate, which is an estimate of the percentage of students who would drop out in a four–year period based on data collected for a single year	14–17	Yes	Yes
	Children with access to child care	Percentage of children ages 0–13 with parents in the labor force who have access to licensed child care	0–13	No	No
Emotional well–being domain:	Youth suicide rate	Number of suicides per 100,000 youth age 15–24	15–24	Yes	Yes
	Self–inflicted injury hospitalization rate	Rate of non–fatal self–inflicted injury hospitalizations per 100,000 children/youth ages 5–20	5–20	Yes	Yes