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Family Affluence Scale Revisited: Accumulation of Material Possessions Versus Children's Perception of Their Family Being Well-off

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Abstract

In his original theory, Bronfenbrenner[1] postulated that in order to understand human development, the entire ecological system in which growth occurs should be taken into account. Likewise, to understand children's health outcomes, the entire ecological system in which health outcomes occur should be taken into account. In investigating the ecological system for children's health outcomes, researchers have focused on household income, risk factors, and wealth. Wealth was conceptualized as an underlying trait, or latent construct (i.e., as a reflective index), and the Family Affluence Scale (FAS) was developed to measure it.[17] However, items comprising the FAS failed to meet the minimum factor analysis criteria for inclusion. A second variable, children's perception of their family being well-off, was used, and it produced a "gradient" for children's health outcome (e.g., physical health, emotional health, wheezing). Consequently, the utility of investigating the accumulation of material possessions (as measured by the FAS) versus children's perception of their family being well-off was discussed. Clearly, the second variable avoids the difficulty with factor analysis. Implications for health education were discussed.

Introduction

In his original theory, Bronfenbrenner[1] postulated that in order to understand human development, the entire ecological system, in which growth occurs, needs to be taken into account. This system is comprised of four socially-organized interrelated and interacting subsystems that support and guide human development. Each system depends on the contextual nature of the person's life and offers an ever-growing diversity of options and sources of growth. Furthermore, within and between each system are bi-directional influences. These bi-directional influences imply that relationships have impact in two directions, both away from the individual and towards the individual. As with Bronfenbrenner's postulation about human development, health outcomes for children must be understood within the context of the larger environment: the microsystem, the mesosystem, the exosystem, and the macrosystem. Within this larger environment, we have social determinants of health. Broadly speaking, "social determinants", within this context refer to social, economic, and political resources and structures that influence health outcomes.[2,3] To illustrate, for groups already disadvantaged by their position in a social hierarchy, reduced access to resources increases their likelihood for poor health outcomes.[4] Thus, when you depict the relationship between family income and life expectancy, a gradient emerges.[5] The greater the family income, the longer the life, creating a stepwise climb towards the healthier,

wealthier side. Social epidemiologists refer to this gradient as the tendency of health outcomes to line up on a steady slope from the have-leasts to the have-mosts.[6] This outcome, however, does not prove that social, economic, and political resources and structures cause health outcomes. Rather, they control access to health care, which has the potential to prevent illness, provide early health care interventions, and extend life. At the same time, the absence of social, economic, and political resources and structures does not mean a person cannot experience a good health-related quality of life.

A healthy lifestyle (e.g., vegetarian, vegan, exercise, water, sunshine, adequate sleep, etc.) adopted early in life will support optimal health in the absence of social, economic, and political resources and structures. The case study of a 60 year old African American female supports this conclusion. Her parents have been deceased for 36 years, and of her five siblings, two died from diabetes complications, and the remaining three are diabetic. She has practiced a vegetarian lifestyle and exercised regularly for 42 years. She sees her healthcare provider annually, but is not on any medication.

The investigation of health outcomes for children has included household income[8], social risk factors[11], and family affluence[12]. A multivariate logistic regression analysis of data from the 2003 U. S. National Survey of Children's Health involving 102,353 children aged birth to 17 years produced a gradient similar to the gradient observed for adults. A significant linear relationship was observed between household income and a child having asthma, migraine/severe headaches, or ear infections with children more likely to have the illness if their family was closer to the federal poverty level. Potentially mediating variables, namely parental mental health, number of children, and family structure had consistent associations across health outcomes.[8] Thus, an income gradient exists for certain child health outcomes, even after controlling for other traditional measures of socioeconomic status.

This income gradient has been observed internationally with children living in the least advantaged countries dying at higher rates than those living in the most advantaged countries.[9] This differential worsened considerably after 1987, and by 1992 had a substantive impact on U. S. life expectancy at birth, resulting in perhaps the most significant (in terms of years of life lost) reversal in the health of the U. S. public in the 20th century.[9] A study in England found only weak evidence of an income gradient for subjectively assessed general health status, and no evidence of an income gradient for chronic conditions except for asthma, mental illness, and skin conditions.[10]

Using data from the 2003 U. S. National Survey of Children's Health involving 102,353 children from birth to 17 years, eight social risk factors were tested as independent predictors of four parent-reported child health outcomes: global health status, dental health, socio-emotional health, and overweight. These risk factors were combined into a categorical "social risk index" ranging from low risk (0 risk factors) to very high risk (≥ 6 risk factors), and risk gradients were examined using linear polynomial testing and multivariate logistic regression. The percentage of children in poorer health increased with the number of social risk factors across all health outcomes. Thus, multiple social risk factors have a cumulative effect on parent-reported child health status across physical and socio-emotional domains, demonstrating a very strong risk gradient effect.[11]

Another approach to investigating health outcomes for children is conceptualized wealth as an underlying socioeconomic state, or latent construct (i.e., as a reflective index), with associated measures.[18] The

Family Affluence Scale (FAS) was developed for this purpose, and it uses four items that are included in the Health Behavior in School-Aged Children (HBSC) Study:

1. Does your family own a car, van, or truck?
2. Do you have your own bedroom for yourself?
3. During the past 12 months, how many times did you travel away on holiday with your family?
4. How many computers do your family own?

Using the FAS, a wide range of health indicators in the HBSC study has been examined. Most of the investigations have been cross-national. Children with lower FAS scores were found to consume more soft drinks and high-sugar foods compared to children with higher FAS scores.[12] The children with higher FAS scores brushed their teeth more frequently,[13] exercised more,[14] and displayed poor mental well-being (not feeling happy, not feeling confident and feeling helpless).[15] Despite the widespread use of the items in the FAS and research to establish its validity, it may not be bias-free.[9] Thus, the critical review of its component items should continue. The current study's purpose was to revisit the FAS to assess its factorial validity.

Methods

Research Design

The current study employed a three-stage cluster design. In addition, it used a descriptive research design, which focuses on describing some phenomenon, event, or situation.[19]

Description of Sample

The school district was the primary sampling unit (PSU) or first stage (sometimes smaller districts were combined as a single PSU), school was the second stage, and classroom was the third stage. The targeted age groups were 11.5, 13.5, and 15.5 years of age. The three selected age groups correspond approximately to grades 6, 8, and 10 in the United States. However, the degree of correspondence varied greatly, depending on the frequency with which students were held back academically (repeated a grade) and the time of year when the survey was administered.

The sample was comprised of 9,227 students whose gender was 48.3% (n = 4,456) male and 51.4% (n = 4,742) female, and 0.3% (n = 29) missing. Of the 9,227 students 43.7% (n = 4,030) were White; 18.3% (n = 1,692) were Black; 2.8% (n = 261) were Asian or Pacific Islander; 1.9% (n = 174) were American or Alaskan Native; 0.7% (n = 66) were Native Hawaiian or other Pacific Islander; 21.2% (n = 1,960) were other; 9.7% (n = 893) were two or more races, and 1.6% (n = 151) did not indicate race.

Procedure

We created a user name and gained access to the data set (0315-0001) through Interuniversity Consortium for Political and Social Research. After gaining access, the file was located and downloaded in the Statistical Package for the Social Sciences.

Results

As previously stated, items comprising the FAS have been conceptualized as measuring an underlying trait, or latent construct of wealth (i.e., as a reflective index).[19] According to factor analysis, items comprising a

scale and measuring an underlying trait or latent construct should display a communality of 50% or greater in factor analysis.[16] In public health, the term "trait" is usually limited to personality characteristics that are typically long lasting or permanent, while the term "state" describes a condition that may change. Graph 1 shows the communalities for the items comprising the FAS. Several items comprising the FAS failed to display the minimal communality for measuring wealth as an underlying latent construct. Since the individual items comprising the FAS clearly measure material accumulation (e.g., how many cars, how many computers, etc.), they were correlated with children's perception of their family being well-off. The scale for this item is: Not at all well-off, not well-off, average, quite well-off, very well-off. Items comprising the FAS displayed a weak and sometimes insignificant relationship with the children's perception of family wealth item: $r_{computer} = .135$, $r_{cars} = .119$, $r_{vacations} = .202$, $r_{bedroom} = -.092$. Thus, children's perception of their family being well-off might not have a strong link to their family's material possessions. The current study investigated this variable's (children's perception of their family being well-off) relationship to physical health, asthma, and emotional health.

Five items reflecting physical health were chosen because of their biophysical nature:

- Past 6 months how often you had: headaches
- Past 6 month months how often you had: stomachaches
- Past 6 month months how often you had: feeling low
- Past 6 month months how often you had: difficulty sleeping
- Past 6 month months how often you had: feeling dizzy

Factor analysis was applied to the above items, and the emerging factor explained 50% of the variance, Eigenvalues = 2.50. This factor was named physical health. High composite scores indicated lower frequency for headaches, stomachaches, feeling low, difficulty sleeping, and feeling dizzy. Also, the range for the composite of the five items is 5 – 30. Thus, a child with 15 would have a higher frequency for headaches, stomachaches, feeling low, difficulty sleeping, and feeling dizzy than a child with 20.

Since a high intake of sugar (e.g., soft drinks) can result in headaches, stomachaches, backaches, and dizziness,[19,20] the items comprising the operational definition of physical health might have sugar intake in common.

The three following items were chosen for asthma:

- Doctor ever told you that you have asthma
- Ever had wheezing
- Been to a doctor/ER for wheezing past 12 months

Factor analysis was applied to the above items, and the emerging factor explained 52% of the variance, Eigenvalues = 1.56. However, "doctor ever told you that you have asthma" and "been to a doctor/ER for wheezing past 12 months" did not display a higher enough extraction to be included in the factor, 0.475 and 0.42, respectively. Consequently, "ever had wheezing" was used as the measure of asthma. This variable was coded 1 for no and 2 for yes.

Relative to the above health variables, a significant effect was observed for children's perception of family being well-off, $F_{\text{physical health}}(4, 8695) = 101.43$, $p = .0001$; X^2_{asthma} $(4, N = 7016) = 32.37$, $p = .0001$. Figure 1 shows a gradient for health and children's perception of their family being well-off. Thus, physical health tended to vary with children's perception of their family being well-off. For asthma, 21.1% of the children perceiving their family as very well off responded yes to "ever had wheezing", 22.3% of those perceiving their family as quite well off responded yes, 23.7% perceiving their family as average said yes, 32.6% of those perceiving their family as not very well off stated yes, and 28.5% perceiving their family as not at all well off said yes (See Graph 2). A gradient is observed for "ever had wheezing" and perception of family being well off. As perception changed from not at all well off to very well off, a decrease in the frequency of "ever had wheezing" was observed.

In addition to physical health, emotional health was investigated as a function of children's perception of their family being well-off. Factor analysis was used to construct this variable (See Table 3). Items comprising this variable included:

1. Feeling past 30 days: Very sad
2. Feeling past 30 days: Grouchy/Irritable
3. Feeling past 30 days: Hopeless about future
4. Feeling past 30 days: Feel like not eating

A gradient was observed for emotional health (See Graph 3). Also, a significant difference emerged, $F_{\text{emotional health}}(4, 8770) = 152.05$, $p = .0001$, for children's perception of their family being well-off. Higher scores for emotional health indicated better emotional health, and higher scores of children's perception of their family being well-off suggested a more positive perception. Thus, as children's perception of their family being well-off increased, their emotional health improved.

In addition to children's perception of their family being well-off, race was investigated. Significant racial differences were observed for physical health, asthma, and emotional health, $F_{\text{physical health}}(6, 8841) = 8.67$, $p = .0001$; X^2 $(6, N = 7072) = 34.67$, $p = .0001$; $F_{\text{emotional health}}(6, 8857) = 5.20$, $p = .0001$. Asians displayed the highest physical health score (See Graph 5), and they displayed the lowest intake of sugar. Only 16.6% of Asians consumed a soft drink once a day or every day more than once. Consumption of soft drinks once a day or every day more than once for the other ethnic groups ranged from 22.7% to 47.3%.

American Indian or Alaskan Native displayed the highest emotional health scores (See Graph 6). Of the 7,072 children who responded to "ever had wheezing", 26.7% of the African American children stated yes, 23.9% of the White children indicated yes, 21.4% of the Asian children said yes, 26.1% of the American Indian children said yes, 29.4% of the Native Hawaiian children stated yes, 18.7% of Other race children said yes, and 27.8% for Two or More races said yes (See Graph 6).

When children's perception of family being well-off and race were considered together, three significant interactions were observed, $F_{\text{family well-off x race for physical health}}(23, 6715) = 3.92$, $p = .0001$; $F_{\text{family well-off x race for emotional}}(23, 6715) = 2.50$, $p = .0001$, and $F_{\text{family well-off x race for asthma}}(23, 6715) = 1.54$, $p = .05$ Thus, there was a combined effect of race and children's perception of their family being well-off upon children's physical and emotional health, and wheezing.

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Discussion

The FAS has a long history for displaying a "gradient" for children's health outcomes. For example, children with lower FAS scores were found to consume more soft drinks and high-sugar foods compared to children with higher FAS scores.[12] The children with higher FAS scores brushed their teeth more frequently,[13]exercised more,[14] and displayed poor mental well-being (not feeling happy, not feeling confident and feeling helpless).[15] Since items comprising the FAS tend to capture the accumulation of material possessions, there appears to be a relationship between the accumulation of material possessions and children's health outcomes. The ecological system theory would suggest that the accumulation of material possessions, which resides in the child's ecosystem, influences the child's health outcomes. However, the acquisition of material possessions is as much a function of debt as it is of wealth. Thus, the FAS is probably not a pure measure of wealth. Higher scores on the FAS might not suggest greater wealth.

Children's perception of their family being well-off avoids the difficulty inherit in use of the FAS. At the same time, it is independent of a family's accumulation of material possessions. Thus, a child whose family has little material possessions can have a perception of his or her family being well-off. Inversely, a child whose family possesses much material possessions can have a perception that his or her family is not well-off.

Given the FAS' "gradient" with children's health outcomes, income equity would have to be achieved to reduce children's health disparity. This outcome is most challenging, if not impossible. However, children's perception of their family being well-off can be more easily affected. Thus, there is an opportunity here for public health to partner with social work, psychology, and human development to improve children's health outcomes by strengthening families.

While additional research exploring the link between children's health outcomes and their perception of their family being well-off is needed, the current findings suggest implications for policy. Optimism has been linked to a number of different positive health-relevant outcomes, ranging from the development of physical symptoms to recovery from coronary artery bypass surgery.[21] Using Bronfenbrenner's model, could children's ecological system influence their level of optimism? If so, more energy should be expended on enhancing children's ecological system, especially that part which has the strongest influence upon them (e.g., family, school, church).

Clearly, these findings should be disseminated and discussed in pre-service health professional education. Also, additional research should investigate the relationship between children's health outcomes and their perception of their family being well-off. Furthermore, since the FAS captures the accumulation of material things, differences in children's health outcomes should be explored within the context of families being defined by their use of credit to acquire material things.

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Table 1

Communalities for Items Comprising the Family Affluence Scale

	Initial	Extraction
X1 Number of computers family owns	1.00	.482
X2 Do you have your own bedroom?	1.00	.273
X3 Does your family own a vehicle	1.00	.416
X4 Number of family vacations past 12 months	1.00	.325

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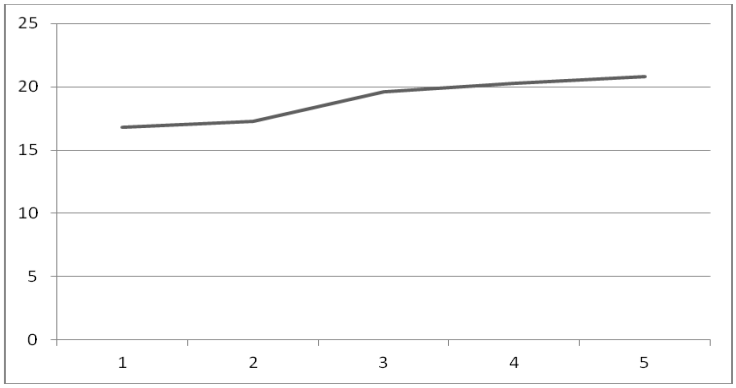
Graph 1

Physical Health[a] *as a Function of Children's Perception of Their Family Being Well-off*



$F_{\text{physical health}}$ (4, 8695) = 101.43, p = .0001

Legend for X-axis:

1 – Not at all well-off
2 – Not well-off
3 – Average
4 – Quite well-off
5 – Very well-off

[a]As health score increases, the frequency of headaches, stomachaches, feeling low, difficulty sleeping, and feeling dizzy decreases.

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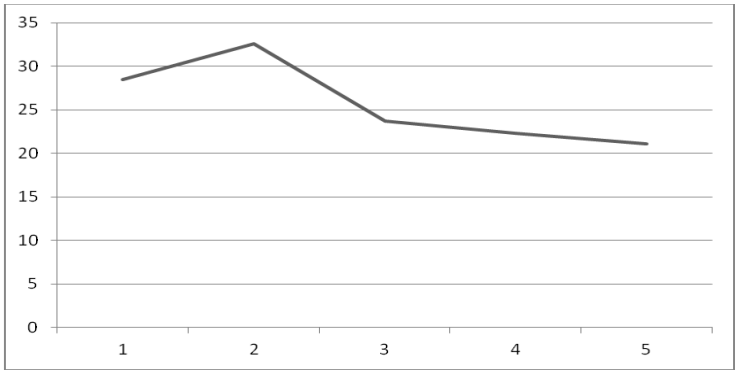
Graph 2

Asthma[b] *as a Function of Children's Perception of Their Family Being Well-off*



X^2_{asthma} (4, N = 7016) = 32.37, p = .0001

Legend:

1 – Not at all well-off
2 – Not well-off
3 – Average
4 – Quite well-off
5 – Very well-off

[b]Percentage of respondents who reported that they had had wheezing.

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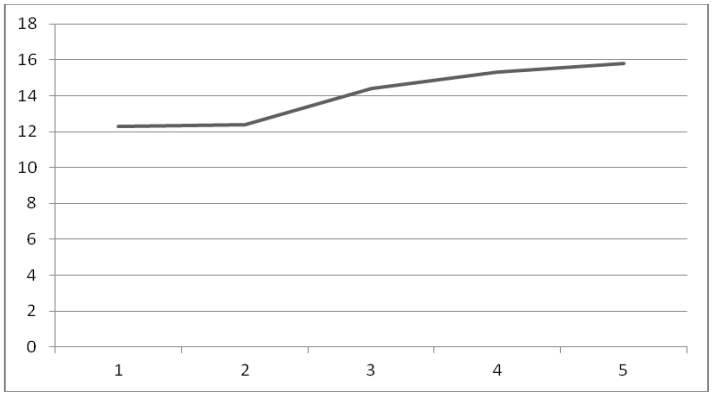
Table 2

Factor Analysis Table for Emotional Health

Items	Loadings Factor 1 Emotional State	Communality
Feeling past 30 days: Very sad	.81	.66
Feeling past 30 days: Grouchy/Irritable	.74	.55
Feeling past 30 days: Hopeless about future	.77	.59
Feeling past 30 days: Feel like not eating	.73	.54
Eigenvalue	2.33	
% of Total Variance	58.28	
Total Variance	58.28	

Graph 3

Emotional Health[c] *as a Function of Children's Perception of Their Family Being Well-off*



$F_{\text{emotional health}}(4, 8770) = 152.05$, $p = .0001$

Legend:

1 – Not at all well-off
2 – Not well-off
3 – Average
4 – Quite well-off
5 – Very well-off

[c]As emotional health score increases, the frequency of feeling very sad past 30 days, feeling grouchy/irritable, feeling hopeless about the future, and feeling like not eating decreases.

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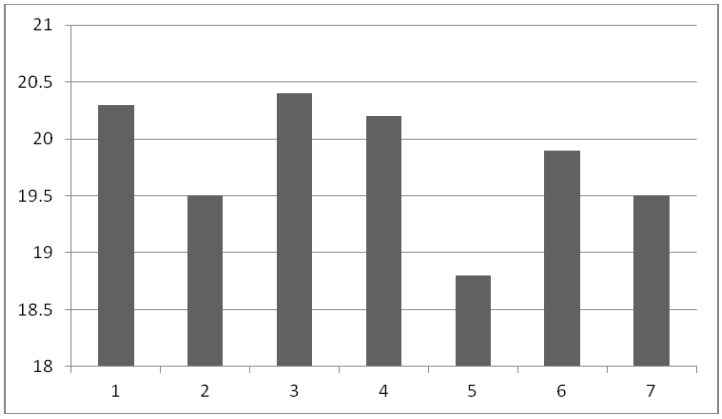
Graph 4

Physical Health[d] *as a Function of Race*



$F_{\text{physical health}}(6, 8841) = 8.67$, $p = .0001$

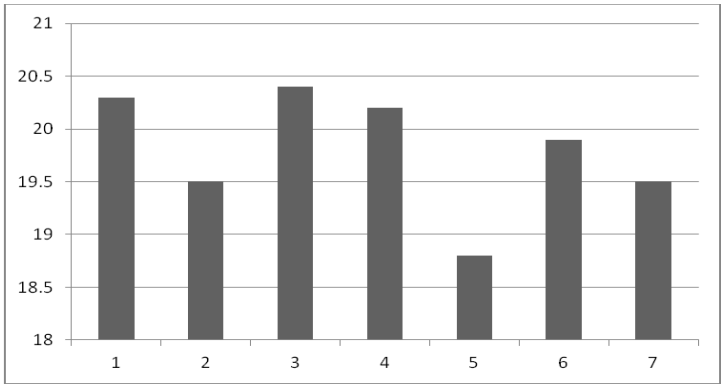
Legend:

1 – Black
2 – White
3 – Asian
4 – American Indian or Alaskan Native
5 – Native Hawaiian or Other Pacific Islander
6 – Other
7 – Two or More Races

[d]As physical health score increases, the frequency of headaches, stomachaches, feeling low, difficulty sleeping, and feeling dizzy decreases.

Graph 5

Emotional Health[e] *as a Function of Race*



$F_{\text{emotional health}}(6, 8857) = 5.20$, $p = .0001$

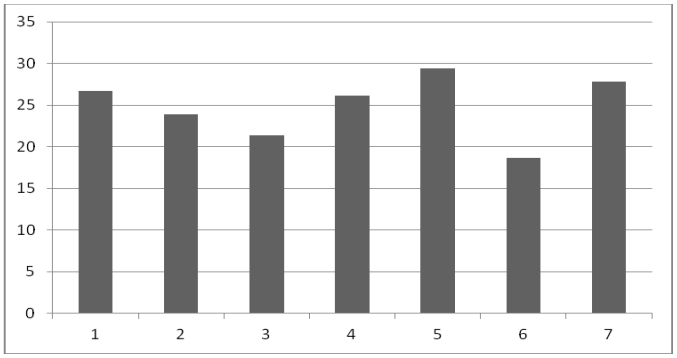
Legend:

1 – Black
2 – White
3 – Asian
4 – American Indian or Alaskan Native
5 – Native Hawaiian or Other Pacific Islander
6 – Other
7 – Two or More Races

[e]As emotional health score increases, the frequency of feeling very sad past 30 days, feeling grouchy/irritable, feeling hopeless about the future, and feeling like not eating decreases.

Graph 6

Asthma[f] *as a Function of Race*



X^2 (6, N = 7072) = 34.67, p = .0001

Legend:

1 – Black
2 – White
3 – Asian
4 – American Indian or Alaskan Native
5 – Native Hawaiian or Other Pacific Islander
6 – Other
7 – Two or More Races

[f]Percentage of respondents who indicated that they had had wheezing.