

The paradoxical “Hispanic Paradox”

The dark side of acculturation

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Abstract

Since first described by Markides and Coreil in 1986, multiple authors have attempted to unravel the curious finding that Hispanic Americans appear to, in spite of seemingly disadvantageous health factors, to have better outcomes than expected. While there have been some dissenting studies, the preponderance of evidence seems to support the finding, although the exact mechanism remains elusive. A computational analysis of the 2011-2016 data on the counties of Arizona and New Mexico contained in the Robert Wood Johnson Foundation’s County Health Rankings and Roadmaps confirmed that this Hispanic Paradox does indeed exist. However additional factors, such as the distribution and concentration of the Hispanic population, appear to be necessary in order for it to manifest. It is maximized once a critical level of population percentage and lack of acculturation are met. These levels are achieved in some counties in Arizona, but are absent in New Mexico, despite an average county Hispanic population percentage only 60% that seen in New Mexico. In this regard, the Hispanic Paradox appears to follow the same dynamics as that seen in the Roseto Effect described in the 1960’s and may be related to the differing effect of curanderismo in these areas.

Highlights

- The relationship between Health Outcomes and Health Factors is complex and nonlinear and is governed by a transformational function.
- The so-called “Hispanic Paradox” in health outcomes is caused by such a function.
- Acculturation is but one element that influences that function.
- Both the function and the Health Factors must be addressed in improving Health Outcomes

Introduction

Despite methodological limitations of much of the research, it can be concluded with some certainty that the health status of Hispanics in the Southwest is much more similar to the health status of other whites than that of blacks although socioeconomically, the status of Hispanics is closer to that of blacks... Factors explaining the relative advantages or disadvantages of Hispanics include cultural practices, family supports, selective migration, diet, and genetic heritage.¹

The term “Hispanic Paradox” was coined by Markides and Coreil in 1986 to explain their finding that, although the socioeconomic situation of Hispanics in the Southwest was more akin to those of Blacks, their health outcomes were similar to, or in some instances even better than, the non-Hispanic white population in the same areas.¹ This finding has been persistent, as explored in the review article by Franzini, Ribble and Keddie who concluded the phenomenon was real and multifactorial² By studying death rates from individuals with Hispanic surnames in Texas, Smith and Bradshaw have questioned this, and felt the Hispanic Paradox was an artifact of study methodology.³

The monumental Robert Wood Johnson Foundation study, “County Health Rankings and Roadmaps”, provides a large amount of data with which to explore this phenomenon.⁴ This study compiles standardized Health Outcomes and Health Factors data on virtually all counties in the United States from 2011-2016. Within each state, Health Outcomes, Health Factors, a number of sub factors in each category and select demographic data is given and ranked both as ordinal numbers as well as with Z-Score⁵ Rankings do not cross state lines, as the authors feel the infrastructural elements involved in health are primarily organized along state lines.

Material and methods

Because of concern that some of the disparities in prior studies may stem from geographic variability in the expression of the Hispanic Paradox, Arizona (25.3% Hispanic, midrange among states) and New Mexico (42.1% Hispanic, highest among states) were chosen for analysis.⁶ The spreadsheet data on these states from 2011 through 2016 were downloaded from the “County Health Rankings and Roadmaps” website and entered into Excel[®] for Mac spreadsheets (Microsoft Excel[®] for Mac, version 15.21.1, Microsoft Corporation, Redmond, WA). The data was manipulated within the spreadsheets and exported to both Data Desk[®] (Data Desk[®] 6.3 (OS X), Data Description, Inc., Ithaca, NY) and Wolfram Mathematica[®] 10 (Wolfram Mathematica[®] 10, version 10.1.0.0, Wolfram Research, Inc., Champaign, IL). Additional GIS data on demographic distribution within the target areas was obtained from the justicemap.org website.⁷

The data from the six years 2011-2016 were pooled for each state and correlations tested for Health Outcomes, Health Factors, percent Hispanic, Non-Hispanic White, non-English speakers, Native American and rural populations. In order to investigate if some counties ranked higher on Health Outcomes than on Health Factors (indicated a performance better than expected) an additional element was created by subtracting the Health Outcomes Z-Score from the Health Factors Z-Score.

Results

Health outcomes

Six years of data was available for 15 counties in Arizona (90 data points) and 32 counties in New Mexico (192 data points). The percentage of Hispanic Population was plotted against the Health Outcomes Z-Score (Figure 1.).

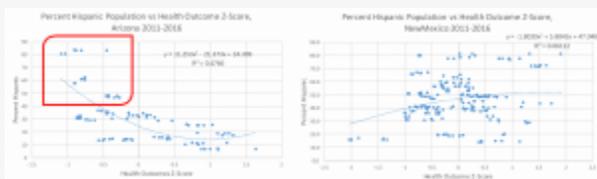


Fig. 1: Percentage of Hispanic population vs. Health outcome z-scores

Note minimal correlation in New Mexico. In Arizona, all counties with Hispanic populations above @ 44% had better than average Health Outcomes.

A difference between Arizona and New Mexico is readily apparent. A Z-Score of 0 indicates an average Health Outcome. Negative Z-Scores indicate Health Outcomes better than average. In Arizona, counties with Hispanic populations above @ 44% all had Health Outcomes better than average (red box). Although not conclusive, the majority of counties in New Mexico with a high Hispanic percentage had Health Outcomes worse than average.

Expected vs. actual performance

The basis for the Hispanic Paradox is the fact that a population has better health results than would be expected. In order to investigate the potential disconnection between Health Factors and Health Outcomes, the Z-Score for the Health Outcomes were subtracted from the Z-Score for Health Factors. A positive result would indicate that county “over performed” and had better Health Outcomes than would ordinarily be expected if there was a linear relationship between Health Factors and Health Outcomes.

There appears to be a phase shift at an Hispanic population of @ 45% in Arizona. Below that, there is a suggestion that a low percent of Hispanic population is initially associated with a worse than expected performance. This evens out from 20-40%. In New Mexico, no clear association can be seen.

Facility with the English language

A similar situation is seen when facility with English was graphed against Health Outcome Z-Scores (Figure 2). In Arizona, counties that had a percentage of NonEnglish Speakers above @ 13% all had Health Outcomes better than average. Again, an abrupt change in the slope of the line was seen at this apparent phase-shift. In New Mexico, no such association was seen. In addition, the prevalence of NonEnglish speakers overall was less in New Mexico.

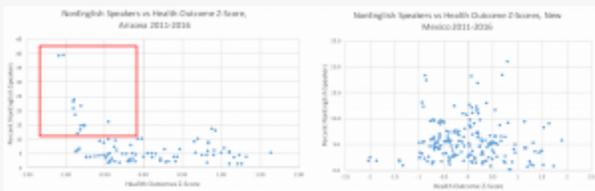


Fig. 2: Percent of non-English speakers vs. Health outcome z-scores

An apparent phase shift is seen in Arizona at @ 13%.

Distribution of Hispanic population and non-English speakers

The distributions of both the percentage of Hispanic population and NonEnglish Speakers across the counties, ranked in increasing value of Hispanic population are seen in Figure 3.

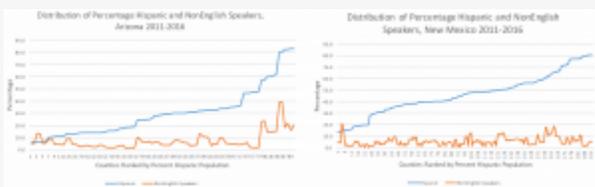


Fig. 3: Distribution of Hispanic and non-English speakers in Arizona and New Mexico

Anomaly at left end of each chart are caused by high values for non-English Speakers in 2011 and 2012 for Apache County (Arizona) and McKinley County (New Mexico). The significance of this is unclear.

In New Mexico, the overall Hispanic population percentage is greater than in Arizona, and the distribution is fairly even in its rise from the lowest county (13.6%, McKinley, 2014) to the highest (80.6%, Mora, 2014-2016). The distribution of NonEnglish Speakers fluctuates with no discernible pattern. In Arizona, however, the picture is different. Again, there is a fairly even rise in Hispanic population percentage from the lowest county (6.0%, Apache, 2014) to Pima county in 2016 (36.1%). From there it jumps in a stepwise fashion to its maximum (82.9%, Santa Cruz, 2014). This is mirrored by a similar stepwise increase in percentage of NonEnglish Speakers.

Three-dimensional surface plots can help visualize the complex relationships between percentage of Hispanic population, NonEnglish Speakers and Health Outcomes (Figure 6) and percentage of Hispanic population, NonEnglish Speakers and Better Than Expected performance (Figure 4).

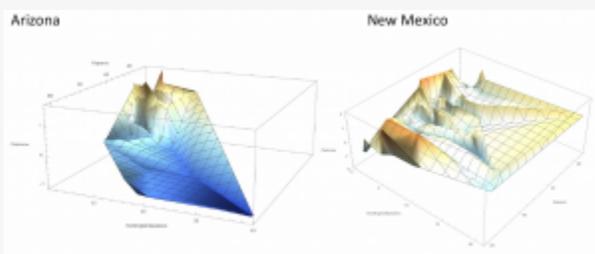


Fig. 4: Mathematica® 3D surface plot of percentage Hispanic population, non-English speakers and health outcomes

Best health outcomes are located at the blue “valleys”.

The analysis shows that an “Hispanic Paradox” seems to be clearly present in Yuma and Santa Cruz counties in Arizona for all of the years studied. In these counties, Health Outcomes were always better than average, and always better than expected. Both counties are located on the United States/Mexico Border. Both are majority Hispanic with that percentage increasing 2011-2016 (Yuma @ 57-62%, Santa Cruz @80-83%). Both have high NonEnglish Speakers, with that value decreasing 2011-2016 (Yuma @23-14%; Santa Cruz @39-21%).

The situation in New Mexico is less clear. Although the percentage of Hispanic population is higher, it is more dispersed with the highest percentage of those of Hispanic heritage located in the north central portion of the state⁷

Discussion

Our findings suggest that the Hispanic Paradox is associated with an increase in both percentage of Hispanic population AND percentage of NonEnglish Speakers beyond a critical level. At that level, a phase-shift occurs in both Health Outcomes and the positive uncoupling of Health Outcomes and Health Factors. In other words, those counties both have better absolute Health Outcomes, and do so to a degree not expected by their Health Factors. In this regard, Arizona is quite different from New Mexico as it fulfills both of these requirements.

Gallo and associates explain the existence of the Hispanic Paradox on the basis of what they term “Reserve Capacity”⁸ In this model, Hispanics with better Health Outcomes are better able to overcome socioeconomic stress (SES) because of characteristics of their culture. These cultural characteristics include strength of social network ties⁹

Lara and associates have studied the implication of acculturation on Hispanic health in the United States.¹⁰ In their review of scales of acculturation, they stress that all use language as a marker for level of acculturation. Combining these concepts, we can form the hypothesis that the strength of social network ties within a group culture can provide the Reserve Capacity with which to resist the negative effects of SES and improve Health Outcomes. Acculturation thus has a complex influence on Health Outcomes.

More to the point of our study are older investigations into the effect of *curanderismo* on views of disease and health care. *Curanderismo* is a folk world view that is characteristic of Latino society in the Western Hemisphere.^{11·12·13} This complex, syncretic, eclectic and holistic social support system has been postulated to be responsible for better-than-expected health outcomes, and may partially explain what is seen in Arizona among more recent immigrants. In New Mexico, on the other hand, the centuries of life on the land has been associated with a marked decrease in *curandersismo*.¹⁴

Acculturation brings both positive effects on health, such as increased socioeconomic advantages, but also negative effects such as poor diet and increased substance abuse. Acculturation may also negatively affect the development and maintenance of a social support network, family and group identity and values.

Is there a basis upon which to make these assertions? In the mid 1960’s, a series of articles explored what was termed the “Roseto Effect”.^{15·16} Patients in Roseto, PA were exhibiting improved Health Outcomes that were out of proportion to the expected Health Factors. Heart disease was remarkably reduced despite a diet high in fat and poor life styles. After an extensive search for possible reasons, it was concluded that the basis for the improved Health Outcomes was the social support network provided by a cohesive cultural unit. Unfortunately, over time the “acculturation” of this population led to a deterioration of this positive effect on Health Outcome.¹⁷

Conclusions

This study has important implications for health disparity research and is the first stage of prehypothesis research ultimately leading to the development of an agent-based model of the relationships between Health Factors and Health Outcomes. Health is a Complex Adaptive System that operates under emergent order. Attempts at imposition of external order, such as well-intentioned “improvement” in some Health Factors may have unintended negative consequences if they disrupt the existing cultural structures providing Reserve Capacity. An example of how cultural structures can be augmented to actually increase Reserve Capacity while adding positive Health Factors can be seen in the experience of the Southcentral Foundation in Alaska. ¹⁸ By advancing cultural cohesion while improving Health Factors, Southcentral Foundation has achieved impressive Health Outcomes and won a Baldrige Award National Quality Award in both 2011 and 2017.¹⁹

The anomalous “Hispanic Paradox” and the differences seen in Arizona and New Mexico point to a much larger concept. Rather than a simple linear relationship between Health Outcomes and Health Factors, we should understand this as a dynamical system where Health Outcomes is the product of a transformational function operating upon Health Factors:

$$\text{Health Outcomes} = f(\text{Health Factors})$$

Increasing Health Outcomes can be achieved by either increasing the net positive Health Factors or through alteration in the transformational function. Understanding that transformational function is a subject of our ongoing investigations that will hopefully lead to the ability to ask the right questions regarding health disparities. It may very well be that giving attention to optimization of the transformational function will be a much more cost-effective measure than increasing the underlying Health Factors.

Footnotes

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