

*Using GIS Lifestyle Segmentation to Profile Physically Inactive
Lifestyle Clusters in BCC Project Sites
(proposed by Dr. Greg Welk and Dr. Fred Fridinger)*

Statement of primary research question:

Marketing databases are widely used in the commercial sector to develop messages to promote products and services to potential customers. They contain proprietary and public information on sociodemographic characteristics, consumer behavior, lifestyle activities, and media habits of potential customers. A primary use of such data is to identify audience subgroups that may differ in interests, lifestyle, and media habits in order to design effective messages and deliver them through appropriate media channels (Myers, 1996; Weinstein, 1994). A widely-used framework for audience analysis (geodemographic segmentation) involves grouping together small geographical units on the basis of demographic and other characteristics that they have in common. The clusters derived through geodemographic segmentation provide relatively homogenous and distinctive lifestyle groupings that may be useful for health communication planning and targeting. The purpose of this research is to test the utility of using geodemographic lifestyle clusters to better understand physical activity behaviors across the 15 Behavioral Change Consortium (BCC) projects.

The segmentation system to be used is PRIZM[®] (Claritas, Inc., 1994; Weiss, 1989,1999), developed by Claritas, Inc., a large marketing information services organization. This database includes codes that categorize the population into 62 clusters with distinct demographic and behavioral characteristics, with each of the 15 social groups containing between two to five clusters. Each cluster contains between .5% to 3% of the U.S. population. Every census tract or zip code block group in the U.S. falls into one of these 62 clusters based on their overall demographic characteristics. (Additional information on the development and application of the PRIZM system is included in the Appendix at the end of the proposal)

Contribution of proposed activity to theory development/measurement enhancement:

Social marketing is a relatively recent health intervention methodology that has been defined as “the application of commercial marketing technologies to the analysis, planning, execution, and evaluation of programs designed to influence the voluntary behavior of target audiences in order to improve their personal welfare and that of their society” (Andreasen, 1995). Central to the social marketing approach is a “consumer orientation” to program development and implementation based on precise audience segmentation strategies. The target population is segmented or separated into homogenous groups that are uniquely targeted with messages tailored to their shared qualities. Finding better ways to identify who the targets are, what they are like, where they are located, and how they can be reached are important aims of the field of public health education. A better understanding of social marketing approaches will be especially important as promising interventions and trials move from efficacy to dissemination.

BCC’s unique position to address this research question:

A goal of the BCC is to test innovative behavior change strategies and advance current understanding of effective intervention strategies. The broad range of sites and projects in the BCC would provide a useful testing for the potential effectiveness of these social marketing techniques. The results from this project may serve as a useful pilot test for subsequent BCC activities and projects.

Specific research question and hypotheses:

The specific objectives of this research study are to:

- (1) Identify predominant lifestyle clusters within the defined geographic areas of the 15 BCC projects;
- (2) Profile these lifestyle clusters using a market segmentation software system that combines census, geodemographic, and lifestyle information; displaying not only exercise/physical activity

behaviors but how these clusters profile on consumer behaviors such as media usage and product purchase behavior;

- (3) Incorporate specific BCC project data (determined by individual sites) into the PRIZM profile system to address how the lifestyle clusters profile on project specific parameters;
- (4) Assist BCC project staff in interpreting the cluster profile data for intervention, communication and outreach purposes.

Sites

We are interested in conducting this study at all 15 BCC sites. The following sites have already expressed a definitive interest and a contact person has been identified.

Site	Principal Investigator	Contact Person
Kansas State University	David Dzewaltowski	David Dzewaltowski
Illinois Inst. of Technology	Tamara Goldman Sher	Lynne Braun
Harvard School of Public Health	Karen Peterson	Chuck Matthews
Stanford University	Abby King	Abby King
University of Tennessee	Robert Garrison	Mace Coday

Data

In this proposed project, four different kinds of data are linked together through geographic identifiers: 1. **U.S. Census data:** Demographic information on the adult population from every household within the United States; 2. **GIS data:** Geographic boundary files, roads, and landmarks (specific mapping software database supplied by Claritas, Inc.); 3. **PRIZM Cluster data:** Market research and demographic data summarized by 62 distinct lifestyle clusters (see description above); and 4. **Project specific data from the BCC sites:** The specific types of data to be combined and analyzed with this system may be variable across the sites or could include some of the common measures being proposed across sites (e.g. stages of change for physical activity). Project specific data can be integrated into the database as long as street addresses and zip codes can be added to the specific dataset.

Emphasis is currently being placed on physical activity outcomes since most sites include physical activity measures and also because it may be possible to directly link specific state-based data from the BRFSS onto the geocoded data. The nature of the design, however would allow each site to select which types of variables or outcomes they want processed with the database. To facilitate the acquisition of this project specific data from all sites, we have included two days of consulting (\$1,000) for each participating site (see budget). This will help offset the time required to convert existing data sets and submit them for use in the project.

Time frame (specify can be done immediately with existing baseline data and what might need to wait for outcome data, and how long proposed activities will take):

The study can utilize existing baseline data. Depending on the timeline of the project, the results from the analyses may prove useful to sites in their continued efforts to understand and influence their target population.

Alternately, the results may help sites to interpret their outcomes. Theory would suggest that the results from a particular intervention may vary for individuals in different lifestyle clusters (ie. materials or strategies may be more effective for one type of population but less effective for another). Pre-post differences could be merged to the other data in the system to examine which lifestyle clusters achieved the best results in the intervention.

Analysis plans:

Using the PRIZM software system, each of the 15 BCC project target populations will be profiled against the PRIZM cluster profiles. The first step in the analyses will be to run a Household Distribution of PRIZM clusters for a selected geographical area (e.g., ZIP code or block groups within the zip code) within each of the 15 BCC projects to determine what percent of the total households in that area can be found in a specific cluster(s). Once the predominant lifestyle cluster (s) is identified in each area, clusters (and hence specific geographical locations) that ranked above average or high on physical inactivity will be identified. Three indices will be generated by the Claritas "Consumer Point" software program that will indicate the extent to which physical activity behaviors occur at above-average or below-average levels for each of lifestyle clusters identified for each project site. These three indices include: *Target Cluster Composition* = Percentage of all those physically inactive individuals who belong to a specific lifestyle cluster; *Target Cluster Coverage* = Percentage of adults within a specific lifestyle cluster that are physically inactive; and *Target Cluster Index* = Measures the extent to which physical activity by a specific lifestyle cluster is above or below the national average (average index = 100).

The principal investigators (Dr. Welk and Dr. Fridinger) would work collaboratively to carry out the major tasks in the project. Dr. Welk would work with the individual BCC sites and project staff to clarify specific variables and outcomes that would be analyzed within the marketing system and to get the individual data sets into formats that can be used with the PRIZM program. Dr. Fridinger would coordinate the processing of this data with the help of a research assistant at his site. The database system used in this project may have implications for other ancillary projects. We welcome collaboration from other groups and additional linkages with other projects.

Estimated Resources: Total estimated cost = \$62,500 (direct only).

1. Salaries and wages

Principal Investigators: Estimated cost is \$14,000

Both investigators would be involved in the overall project over the whole year at approximately 10-12% time. Actual involvement may depend on the scope with which the project is conducted.

Graduate Research: Estimated cost is \$8000.

One Graduate Research Assistant (M.P.H. student) will be hired part-time (~10 hours/week for one year + benefits). Student will be trained in software application, conduct all segmentation analyses, and assist Dr. Fridinger in technical assistance to BCC projects.

Consulting fees: Estimated cost is \$15,000 (2 days at \$500 for each participating site)

A contact person at each site would be identified to assist with converting existing data sets into formats suitable for use with the geocoding systems.

2. General Operations

Software: Estimated cost is \$23,000

Purchase of yearly PRIZM software system license from Claritas, Inc. The *ConsumerPoint* marketing analysis system delivers state-of-the-art reporting, charting, and mapping capacities, and allows the full data system to run in a coordinated manner by integrating demographic, marketing, and cartographic data from a single source. *ConsumerPoint* runs the general applications, and comes with PRIZM market distributions, road and highway mappings, boundaries, software application training, and documentation.

General office supplies: Estimated cost is \$500

Needed for paper, postage, pens/pencils, paper clips, staples, etc.

Capital Equipment: Estimated cost is \$2000.

The parameters of the Claritas PRIZM software license requested in this proposal requires a specific dedicated workstation. One personal computer and accompanying printer are needed in which to load the software, run the analyses and print the results.

Team Leader/Team members:

The project will be coordinated by Dr. Greg Welk (gwelk@iastate.edu) and Dr. Fred Fridinger (ffridinger@hsc.unt.edu). Input or involvement from the different sites may depend on the nature of the specific intervention and their interest in this type of project. A representative from the participating sites would be needed as a contact person on the project.

Development and Background Information on PRIZM

The first step in the development of the current PRIZM system was a series of factor and cluster analyses of the 1990 census data for the more than 226,000 block groups in the U.S. (Barrett, 1994; Lavin, 1996) to account for most of the variation among block groups, resulting in 15 social groups varying along 5 levels of urbanization (rural, town/exurban, 2nd city, metro suburb, metro urban) and 3 levels of socioeconomic status (low, mid, high). A second-stage of domain dependent clustering within each of these social groups subdivided them further into subgroups or lifestyle clusters on the basis of various demographic factors. The cluster solution is then tested and refined with large public and proprietary databases on consumer behaviors involving purchases, media use, consumer credit, and other lifestyle data. Claritas, Inc., conducts a proprietary update of the census data each year and areas are assigned to clusters based on their current-year demographics.

Some of the key differentiating factors among the clusters, along with the general urbanization and SES factors, are the distributions and modal characteristics within the clusters of income levels, family life cycle stages, age, education, occupation, and housing types. The cluster framework also provides finer distinctions for targeting populations defined in terms of race/ethnicity. For instance, Hispanics exceed the national average in 21 clusters and predominate in 5 others.

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