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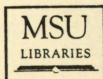This is to certify that the

dissertation entitled

Distinguishing Radio Audience Segments
By Format Preferences in the Multichannel
Programming Environment:
A Multidimensional Approach
presented by

James Walter Dinkelacker

has been accepted towards fulfillment
of the requirements for

_____PhD_____ degree in _Communication

_____
Major professor

Date _Aug 12, 1982_

0-12771

APR 23 '86
MAY 05 '86

JUL 18 '86

OCT 11 '86

MAR 1 9 1992

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DISTINGUISHING RADIO AUDIENCE SEGMENTS
BY FORMAT PREFERENCES IN THE MULTICHANNEL
PROGRAMMING ENVIRONMENT:
A MULTIDIMENSIONAL APPROACH

By

James Walter Dinkelacker

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Communication

1982

ABSTRACT

DISTINGUISHING RADIO AUDIENCE SEGMENTS
BY FORMAT PREFERENCES IN THE MULTICHANNEL
PROGRAMMING ENVIRONMENT:
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By

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This study examined an analytical geometric method for segmenting radio listeners according to format preferences. The purpose of this dissertation was to contribute to radio audience research which presently has minimal theoretical development due to a lack of systematic audience research and an absence of useful analytical methods. In part, this has occured due to rapid technological change in communication technology. Most audience measurement procedures measure audience sizes for competing programs and stations. Radio audience research has received minimal funding and hence radio audience theory is relatively unformulated. While much audience research focuses on the national audience and the programming of the national television networks, radio is primarily a local medium seeking to satisfy the tastes of local, rather than national, audiences. In contrast with commercial audience research the development of radio audience theory requires precise measurement methodologies and procedures for linking radio listening and preferences with other research variables.

This study uses the methods of multidimensional scaling (MMDS) paired comparison measurements. Members of the local radio audience were first surveyed to identify a vocabulary used by radio listeners to describe the music and radio stations that they listen to. Five format types, rock, jazz, top-40, easy-listening, and country-western, were scaled in an MMDS instrument along with the call letters of local FM radio stations, preference indicators, and the self-concepts "myself" and "my radio listening." A radio listening diary and other questions about self-concept perceptions, album purchases, consumption patterns, and program preferences were included.

Specific hypotheses were tested The first demonstrated that perceptual maps of radio audience segments are multidimensional and that non-euclidean geometric methods are appropriate. The second demonstrated the utility of the self concept in a perceptual space for indicating audience format segments, and that the self concept "my radio listening" provided superior discriminations among other research variables than did "myself." Hypothesis III demonstrated geometric methods as predictive of radio listening. Other hypotheses did not demonstrate that the geometric method discriminated audience segments better than rank order methods, but served as well as rank orders and additionally provided measurements of interrelationships among multidimensional variables.

This Dissertation is Dedicated to

ZACHARY FOX

and the life and times of

Radio Rensselaer

WRPI, 91.5 FM, Troy, New York

and YOU, the reader

mathematical tools into the hands of the initiated user. As more and more social scientists become increasingly mathematically literate, the monumental contribution of Woelfel's efforts will be increasingly useful and recognized. I'm thankful for the chances I've had to hear him muse. He is a scholar and a teacher second to none.

My third mentor reigns from my adolesence. My deepest gratitude and most heartfelt appreciation to Mrs. Doris Jenkins of Catskill, New York for training me to always seek to discover alternative explanations and to consult a wide range of opinion. Since my youth, her appreciation for academic pursuits has been a welcome beacon. I also wish to acknowledge Janet Woodburne Peters for teaching me how to use the library as a toy store for the mind. Radio Rensselaer, WRPI, also deserves particular mention because it was during my years with that remarkable organization that I learned the pragmatics of human and electronic communication. And of course, a tip of the hat and a round of applause for my father, Walter James Dinkelacker, for teaching me how to listen. Eardrums are always online and realtime.

In regard to the to the manuscript you are reading, three individuals have contributed to this effort far beyond what can be conveyed in print to strangers. The quality of my life runs at a fine-tuned and happy peak thanks to Carolyn Ruth Fox. Her incessant striving for self-improvement and friendliness should serve as a model for all. Carolyn is a nurse practitioner for the university community and is ever vigilant to health concerns. Her professional demonstration of nursing's expanded role shows real time communication in a field setting. Her studies and observations have provided the most

informative backdrop for my abstract communication theories that could ever be desired. To be in regular touch with illness and health, accidents and prevention, treatment and training, provides one with a useful perspective from which to observe sonambulant academics. Carolyn is the ace.

The perceptivity and clairvoyance of <u>Kimberly Ann Downing</u> is one of life's rainbows. She is intelligent and responsible to an extraordinary degree. Want to know what's going to happen next month? Ask Kim. You'll be amazed at her accuracy. Of all my fellow graduate students, Kim has shown the greatest concern for the people around her, and has set the standards for excellence, honesty, and discipline. As a dancer and an athlete, a political and communication policy scientist, a teammate and companion, Kim's exemplary behavior commands wide respect, and more than one of her professors' faux pax have been caught and recorded by her unerring eye for accuracy. The ideas in this dissertation have been repeatedly hammered against the Downing Anvil. When Kim says that a statement isn't clear, the source can usually assume that there has been an error in transmission rather than in the reception.

<u>Thomas Gerard Faes</u>, computerist and musician extraordinare, has made my time in Michigan an experience to be remembered and treasured. Tom is a man who upon learning of a theory of human behavior steps into the street and tests to see if it works. If it doesn't, his poignant questions and binary logic can very quickly, yet politely, debunk the common random ruminations of so many social scientists. Ockham's razor has not been so deftly wielded by any other hand I've met. Tom has

worked in front of the public for his entire life as a performer. Of course, while everyone watches the performance, the performer has nothing in front of him but the audience under captive scrutiny. Tom's understanding of the use of sound to influence human communication and serve for mood engineering has continually provided a welcome point of perspective on the attributes of non-verbal auditory communication. His novel approach to computer programming and user friendly data base designs serve as an excellent example of designing interaction patterns. These practical applications of human communication have served as an inexhaustable supply of research topics, ideas, and designs. We probably should thank Gibson guitars, Baldwin pianos, Rogers drums, Fender bases, and Selmer saxophones for keeping us sane throughout this excursion. As the song says: "Don't let the sound of your own wheels drive you crazy." The music has kept us on the road and happy, sittin', pickin', and a'grinnin'. Also to be included are Pat Metheny, Carlos Santana, Jean Luc Ponty, Weather Report, Dire Straits, Jaco Pastorius, Erik Satie, Claude Debussy, Richie Cole, Nick Brignola, the Police, Jimi, the Bird, Miles, the Crusaders, and Genesis. "It is real. It is now."

I also wish to acknowledge the many authors who have so strongly affected my thinking. In particular, the works of Gerard O'Neill (The High Frontier), Douglas Hofstader (Goedel, Escher, & Bach), Albert Einstein (The Meaning of Relativity), Charles Moore (inventor of the computer language FORTH), Arthur C. Clarke, Ray Bradbury, Robert Heinlein, and John Brunner have set the stage for much of my own work and most of my future plans. Space industrialization and informatics

are more than a good idea, they are necessary for survival. And also an acknowledgement to John who wrote: "In the Beginning was the WORD . . . ." Doesn't it make you wonder who Washoe's gods are?

In keeping with convention I would also like to acknowledge the members of my Doctoral Guidance Committee. Martin Block, who directed this dissertation, Erwin P. Bettinghaus, who served as chairman of the Guidance Committee, Tom Muth, Tom Baldwin and R.V. Farace. In addition, I would like to express my deepest appreciation to the faculty of the Department of Advertising for having provided a most satisfying working environment for the past several years. Finally, there are no acknowledgements for typists or computer consultants because I did every bit of this work by myself. Now I know that I can do it. What a long strange trip its been. Space is the Place! Let's Go!

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to specific formats and stations, as well as providing as basis for further theoretical refinement of variables encompassed in a study of the radio audience.

Background

"Don't Touch That Dial!" was a notorious plea by commercial announcers in the early days of radio broadcasting. With the success of a broadcasting station heavily dependent upon the size of its audience, the click of the tuning dial could jeopardize the broadcaster's survival in the competitive media market.

Broadcasters are in a fortunate position, particularly if their geographic locale has only one or two other signals competing for the attention of the audience. Even with many competing signals, each broadcaster can still attract a sizeable audience. Because of electromagnetic and geographic constraints, the number of broadcast signals in any market area is restricted by licensure, with a typical market having only three TV and fifteen radio stations. This accounts for the favorable position of the broadcasters. That is, a large potential of listeners is present and there is only a limited set of program alternatives to serve them.

Broadcasting is expensive, and program production requires creative talent, program material (live or recorded), quality resources and local broadcast transmitters that have enormous appetites for electricity. This high expense for program production and presentation offered economic incentives for national networks to form, first with radio and later with television, and now with satellite distributed cable

television radio and television programming. Radio was once the dominant national medium, now radio stations seek their audiences in the local geographic area. After the emergence of nationwide TV networks, radio adapted by orienting to the tastes of local listeners. Musical programming began to dominate air time, but radio stations continued to provide news, sports, and other features. It does not appear to be the case that audience interests are yet saturated. Audience appetites for diverse programming have been illustrated by the continual growth of liscensed radio stations as well as the growth in new audio technology (AM stereo and digital broadcasting) and innovative audio program packaging (digital recording) and innovative network satellite delivery systems (the RKO satellite radio network).

Audience selections are constrained by the range of available programs. In traditional broadcast markets, this set of available signals has been small. In the competitive programming environment, with a vast audience and only a few available programs, commercial broadcasters sought to maximize their audience size by attempting to appeal to the largest number of listeners and viewers. This general programming format is described as the "least objectionable" or the "least common denominator" approach. By programming in this manner, the broadcaster attracted a large cross-section of listeners and viewers. This audience is of interest to advertisers who can economically reach many prospects for their clients. This is the current programming strategy of commerical broadcast television. Radio, in contrast, has been increasingly appealing to more distinctly targeted audiences, as indicated by the growth of ethnic radio programming. The radio

listeners have many alternatives from which to select. Thus, many audiences may be formed. How might these distinct audiences be identified?

Marketing communication has matured considerably since the initiation of age and sex radio audience categories, which are now the standard broadcast audience measurements. Marketers seek identification of their prospects according to additional variables of psychographic and product usage patterns as well as by demographics. In the limited channel programming environment with few competing signals, the rudimentary demographic distinctions have been sufficient to distinguish characteristics of the mass audience. While radio has diversified, the methods of audience accounting and audience research have improved little. Presently, broadcast radio markets have numerous distinct programming services, yet not the methods to identify and address the distinct audiences that are attracted to the programming.

Commercial radio and television are advertising-supported media. For the radio broadcaster, the audience resides in the immediate geographic vicinity and listeners are sought at home, in their cars, and anywhere else a radio might be playing. The radio programmer seeks to appeal to audience members in order to attract an audience. With the continued growth of broadcast radio, particularly stereo FM and AM, listeners are offered a wide selection of programs. Every additional station in a market can serve to further diminish the overall size of any station's audience. In order to attract an audience, programming must be provided that both frequently meets their tastes and doesn't otherwise drive them away to a competing station. As more and more

radio signals are available the competition becomes increasingly intense. The available audience becomes more distributed among the competing signals according to radio format tastes within the audience. This is the situation for the mobile members of the portable and auto radio audience. For the home listener, the competitive situation is even more acute for the broadcaster.

Cable communication is rapidly growing. Cable systems can carry audio entertainment signals that are not available in the local broadcast radio market. The development of MTV (Music Television) leads the way for an home audio and video amalgam utilizing the home hi-fidelity audio system to realize the musical portion of a program while using TV to display the visual component of a performance. Even without the MTV innovation, cable systems can provide a major elaboration of the available audio program assortment. For the home listener, the cable system can provide hundreds of audio services from all over the world from which the subscriber may select. And these are in addition to the locally available broadcast radio signals. The audience's attention is no longer restricted to a limited set of options.

An expanding assortment of audio program offerings continually cater to the audience's varied preferences for alternative program formats as communication technology continually evolves. Given an expanding range of program offerings, a most difficult problem is predicting which ones the audience will select, when they can no longer be easily cajoled to "tune in tomorrow . . ."

Research Problem

This dissertation examines a more refined procedure for discriminating audience segments, or target audiences, according to audience preferences among and within radio formats. A multichannel programming environment is assumed. Audience measurement is central to the operation of any method of segmentation.

Audience measurement, in its usual sense, has come to mean the estimation of audience size, commonly tabulated by age and sex demographics. It is with these estimates of audience size that commercial programming decisions are made. That is, programming styles remain on the air or are discontinued on the basis of a radio station's ability to draw and maintain an audience. The radio station's advertising rate schedule is dependent upon these audience estimates. For advertisers, these figures form the basis for all broadcast media time purchase decisions. With expanding program availability, particularly due to the impact of cable television, satellite distribution of radio and television signals, and the recent authorization of stereo AM, listeners have many more program alternatives from which to choose.

As the range of audio program offerings diversifies, age and sex demographics are of decreasing utility to discriminate among the proliferation of audiences attracted by the competing radio offerings. According to the American Research Bureau's ARBITRON audience ratings service only eleven age and sex discriminations are made. These are

teens (neuter), five men and five women segments. Six age categories are used: 12-17 (teens), 18-24, 25-34, 45-44, 45-54, 55-64. Hence, eleven discriminations within the audience can be made. A complication from these nominal age-sex categories arises in that they are unable to make any discriminations within a specific format category. That is, within a category it is possible to identify that a certain percentage listened to one rock station and a given percentage listened to a competing rock station. These unidimensional techniques are unable to discriminate differences among the audience preferences of the two competing stations. With traditional measures, the audience for the first station falls into the same category as the audience for the second station. Thus, these methods provide no indication as to any reasons that may suggest why part of the audience tunes to one rock station while another part of the audience tunes to a different station. Further research is needed which can address this problem and provide a more refined indication of factors which contribute to the distribution of the radio audience across several stations which compete with the same general programming format. While the industry standard methods are useful for profiling the audience for different audio signals they are of limited utility for developing systematic audience research procedures. Standard syndicated audience research methodologies are useful for audience accounting but suffer from lack of precision and applicability to other behavioral indicators of the local radio listeners. The most comprehensive data base on commercial radio listeners and their product usage is maintained by Simmons Market Research Bureau. However, their data is national in scope, and based on

national samples. Radio, in contrast, is a very dynamic and locally oriented medium. Research has been lacking which studies the radio audience. The bulk of research grants and electronic media study features television analyses. Radio, even though it predates television, has not received comparable analysis either in breadth or depth. Consequently, radio audience research is lacking clearly articulated variables, other than age and sex, and an emerging body of explanatory theory. For example, in a radio market how are similarly programmed radio stations distinguished by the audience? How may program preferences be identified? This research is directed to that end.

As the range of audio program offerings increases, methods are required which can discriminate among the audiences of the numerous audio programs. When program options are limited to a few signals, selective audience preferences are of little importance because the large, undiscriminated mass audience has only a few alternatives from which to choose. Programming has sought to reach the broadest base of this population. With plentiful and diverse program options, programs draw audiences with more specifically targeted program material. As channel capacity and program offerings increase, the audience has become more selective in their listening selections among the offered formats. These selective audiences can be designated as audience segments in that each is part of the overall audience that may tune in an audio signal at any particular instant. Archetypal audience segments of presumed program preferences are the target of broadcasters seeking to draw an audience. When the audio signals can be distinguished according to a

specific programming format (e.g., rock or jazz), the audience that prefers this style of programming can be designated as an audience segment for this programming material. Yet, systematic research procedures are lacking for studying the various format preferences of the audience nor the differences among the audiences of similarly formatted yet distinctly competitive radio stations. The "top-40" youth audience illustrates an audience segment.

Unfortunately, audience measurement methods to date have not adopted informative procedures for segmenting the audience according to their program preferences to any level of detail greater than that provided by the traditional age-sex categories. Hence, they are not instructive in guiding programming decisions designed to discriminate and reach specifically targeted audiences. A specifically targeted audience is comprised of persons who are particularly desirable receivers, as considered by a message source. An advertiser, for example, desires a specific audience of prospects for the presented commercial messages. Yet, current unidimensional methods of audience analysis are not informative as to the audience's format preferences and program selections and can only make 11 distinctions. Further, the formal descriptors used by industry (e.g., Album Oriented Rock or AOR do not serve to discriminate between similarly categorized stations in a market. This is less than the number of competing signals in most radio markets. Thus, audience research is in a position where the commonly applied measurement methods are insufficient to (1) provide further insight as to audience distribution across available audio programming within a particular format category; and, (2) advise advertising

practitioners of distinct characteristics in addition to general demographic characteristics of the audiences drawn to radio. With these data, specially tailored promotional campaigns can be executed for each format audience. What is needed is the development of measurement techniques which can more precisely discriminate among audience preferences and thus provide a basis for further audience research refinement.

The radio audience can become distributed across all available program options, including both the available broadcast signals and any addititonal signals carried to the home by satellite and cable communications. Faced with continuing innovation in telecommunication such as stereo AM, the diversity of available radio programs is increasing. Cable also increases the range of radio and television program signals accessible by a residential subscriber. Current audience research techniques reflect the technological constraints on the audiences' available broadcast signal choices. The number of broadcast signals available to local listeners is constrained by a complex interplay of broadcasting frequencies, terrain, weather conditions, transmitter power, and radio receiver sensitivity. With the increased program offerings afforded by technological advancements such as cable television, audience members can self-select programs more in accord with their preferences from among a wider range of available programs. Common examples of musical formats are jazz, rock, classical, contemporary, top-40, country, easy-listening and ethnic. Radio formats, in contrast, are named for example as Album Oriented Rock, Contemporary, Adult Contemporary and the like which are not closely

allied with the descriptions of musical styles commonly used. Additionally, there is a myriad of other musical and non-musical formats. Many radio markets have multiple outlets for a single format. This is seen by the widespread market competition among top-40 stations for a share of the "youth" audience.

In the multichannel programming environment, sufficient capacity is available to provide numerous distinct formats, in both audio and video services, to the subscriber audience. Now, because of cable communications, the at-home radio audience range of choices could be different due to additional audio services provided by a cable subscription. Radios are portable and go everywhere; they are compact and fit almost anywhere. People listen to the radio both home and away. When away, such as driving to and from work, these listeners are tuned exclusively to local radio programming. At home, the local radio offerings may be unused due to competition by a cable carried distant radio signal. As an example, the local country music station may be the only broadcast country radio in the market. On the cable, it may be one of many. For local market listeners, the country station could lose its subscriber audience to distant signals and financially collapse. For the cable subscriber, the local broadcast radio stations comprise only some of the channels available, with other program options provided by satellite and other local non-broadcast sources. Thus, the current problems in radio audience analysis are underscored by cable communications growth.

Programming seeks to provide material which matches these tastes in order to attract and hold the audience. In the multichannel programming environment, competitive programming seeks to appeal to specific, yet smaller and more homogeneous audiences than those distinguished by traditional audience demographic measurements. In order to study these audiences, it is necessary to identify audience segments that are drawn to distinct programming formats, at a level of discrimination not offered by traditional measures. While the traditional industry measures do serve the audience accounting function, they are not informative for research directed to furthering an understanding of audience preferences. The problem then is how these interests and preferences are to be identified such that the results may be entered into subsequent analyses. This problem remains current in audience research. This is for several reasons:

First, the range of program options available to the audience is currently undergoing rapid expansion. Only several years ago, critics foresaw the shoals for commercial radio. In the 1970s and 1980s radio services have expanded as indicated by the growth of FM and the new authorization of stereo AM. Until recently, audience analysis was based on the model of the broadcast industry, which has as an implicit limitation a small and shrunken maximum of audio signals. Further, traditional methods of radio audience measurement provide eleven distinct categories.

    <u>Second</u>, with the maturing of marketing communications, a greater refinement in market segmentation has been developed. Segments are frequently identified by preference indicators that are suggestive of likely prospects for a marketer's offerings. Similarly, marketers use advertising to reach these people as an audience in the most efficient manner possible. Hence, advertisers are challenged to develop techniques to identify and reach specific target audience segments.

    <u>Third</u>, with continuing innovation in telecommunication, available audio signals continually grow in number and diversity. Thus, the problem of developing refined methods for identifying audience segments for programming remains an emergent issue in radio audience research.

    Improved research techniques for audience analysis are of value in mass communication research, marketing communications, and advertising for distinct reasons. For communication research, traditional procedures are not useful for furthering inquiry into underlying factors of the radio audience selections of programming. Hence, these methods are unable to further theoretical development in communication in regard to the audience. Procedures are needed which are of sufficient precision and discriminability among audience preferences that constructs can be developed, variables can be identified, and hypotheses can be constructed and submitted to empirical verification. In short, prior measurement procedures are uninformative as to theoretical development in communication. Thus, a refinement of these procedures is necessary.

More precise measurement techniques are of great value for marketing communication and advertising for more carefully identifying specific prospects for the programming and the advertisements carried on any station. With a carefully targeted audience of prospects, advertisers may then design persuasive strategies to explicitly reach these prospects. The radio programmer can use procedures of greater refinement as a basis for segmenting the audience according to the subtle format distinctions which suit their tastes but are not readily interpretable from traditional radio audience measurement procedures. For the program director, the audience can be thought of as a set of prospects for program formats, and the competitive programmer then seeks an audience by offering programs designed in alignment with identified audience preferences among the varied offerings in the multichannel environment. We need to differentiate two particular user communities for radio audience research. These are the users primarily engaged in academic radio audience research seeking an understanding of the radio audience, and the users primarily engaged in station management, market research, media planning, radio consulting, and other commercial pursuits. Each user community has its own criteria for the merits of audience research as well as for the information sought by the research. Research is expensive and time consuming and a cost/benefit analysis of the pragmatic utility of any research methodology is based on required accuracy and expenses of precise tolerances. Academics seek maximally accurate and highly precise data for the <u>study</u> of the radio audience. Commercial research seeks maximally accurate data of affordable

precision such that radio can be <u>managed</u> effectively and efficiently. Industry seeks research procedures of wide standardization and high user agreement in regard to data interpretation. Academics seek to extend the current level of knowledge in regard to the 'radio audience and systematic procedures for its measurement such that a theoretical understanding can be furthered. The broad based utility of any approach is contingent to the degree that it can contribute to both communities by providing a basis for academic research whose theories and variables can be pragmatically applied by the practitioner user community. That is the underlying purpose of this dissertation.

Purpose

Current methods of radio audience analysis are limited to simple unidimensional distinctions, usually age and sex, and rarely are any provisions made for other listener characteristics. These demographics are of limited theoretial utility for several reasons. They can not make as many discriminations as there are available radio programs and thus suffer from the problems of a limited response set of program types, lack of focus on the <u>local</u> audience, without incorporating explanatory variables into analysis.

Without additional identifying consumer characteristics, such as format or channel preferences, brand usage patterns, or psychographics, target audiences can not be identified by marketers with sufficient precision to discriminate among the tastes of audiences attracted to like formats on competing stations. Current audience measurement procedures are relatively uninformative to either the programmer to

guide program selection and scheduling, or to the advertiser who seeks a unique demographic or psychographic target audience for promotional purposes. Thus, audience research must address the question of how one might identify characteristics of the audiences' program selections, how audience segments might be identified, and how these audiences might be reached.

What is needed is research directed to refining the identification and interpretations of radio audience program preferences and program selections beyond the currently used unidimensional approaches. Such a refinement entails a specific extension of the unidimensional methods currently in use. It is necessary to seek to identify underlying variables are informative in regard to audience format selections. This would then allow the designation of specific audience segments by format preferences, and not just by previous format selections. What is sought is the development of techniques which afford the ability to contribute to the construction of predicitive models of radio audience listening, rather then the currently used radio audience accounting procedures. As with marketing segmentation, this allows the projection of "format opportunities" in the radio broadcast market as well as providing a basis for assessing the alignment of present programming with audience tastes.

The multichannel competitive programming environment should be expected to be multidimensional due to the diverse variety of multiple program sources. The purpose of this dissertation is to investigate the diversity of radio format preferences within the audio audience and to assess the utility of presently used unidimensional measures, as

compared with multidimensional measures, for segmenting the radio audience. Thus, a direct comparison between unidimensional methods and multidimensional methods is presented as a demonstration of the refinement offered by a multidimensional approach for radio audience segmentation, particularly as this refinement contributes toward developing a theoretical base from which to generate theoretical constructs relevant to the radio audience. Should multidimensional structures be reliably detected within audience preferences this would then suggest that the current unidimensional analyses are no longer be sufficient for comprehensive audience analysis. The goal of this investigation is to aid our identification of audience variables and their interrelationships in order to further our understanding of the processes by which the public at large is distributed over the many competing sources for their ears. Thus, this dissertation attempts to identify audience segments beyond that afforded by traditional unidimensional approaches. This is done by contrasting a unidimensional analysis with a multidimensional analysis of an audiences' program preferences.

Organization

This dissertation contains five chapters and an appendix. Chapter Two reviews literature investigating (1) the radio audience; (2) radio programming and audience preferences; and (3) market segmentation methods which are useful for audience segmentation.

Chapter Three describes the methodology used in the present study. It includes a discussion of common segmentation methods and focuses on multidimensional geometric techniques. Among the multidimensional geometric techniques available, metric multidimensional scaling is recommended for use in this radio audience study. Chapter Three also describes the instrumentation and analysis plan.

Chapter Four describes the research administration and data processing used to accomplish the study. The results are presented and findings described. These are then discussed in regard to the audience segmentation purposes of the research and the research hypotheses. Chapter Five reports the limitations, conclusions and recommendations of this research.

Literature Review

Chapter Overview

This chapter reviews literature that contributes to an examination of a multidimensional approach for radio audience segmentation. This chapter discusses the radio audience, radio programming, audience preferences and market segmentation. The audience is the receiver component of the mass communication process, and is considered as a set of human receivers who intercept or "tune in" programming signals. Audience analysis encompasses the identification and assessment of radio listeners. It is an [...] of mass communication research, particularly in the [...] where there are competing program sources vying for the audience's attention. In the competitive programming environment, financial [...] the programmer's ability to attract and maintain an audience. Further, this audience must be of sufficient size and of appropriate characteristics that it is attractive to advertisers who desire to reach those audience members who are most likely to be receptive to the advertisers' promotional messages. The present analysis seeks to identify [...] radio segments within the audience based on their program tastes. It is not simply enough to have a physical potential to provide adequate signals to receivers. More importantly, available channels are filled with programming that seeks to draw an audience by competitive play with program types, program quality, and scheduling, in order to present material to which people will attend. The commercial broadcasters seek

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the audiences' attention, and attempt to provide programming which is attractive to listeners. Yet, it is not currently possible to precisely identify the audiences' tastes such that formats can be expressly designed.

The problem of discriminating subaudiences from among the radio audience at large has a close analogy in marketing research. The practice of subdividing consumers into specifically designated subgroups whose members have discernable commonalities within particular attributes has been widely useful for meeting general marketing communication plan objectives. Market segmentation is concerned with developing procedures by which consumers can be classified into subgroups as a function of specific consumer characteristics, such as demographics, product usage. Multidimensional methods have been increasingly applied in market segmentation studies to assess these commonalities.

The Radio Audience

In 1981 77.8 million American households had televisions, 78.6 million with radio, and the rapid diffusion of cable television which now serves over 18 million households and is increasingly rapidly, the electronic entertainment industry reaches nearly any American who cares to tune in.[1] For the communication system programmers (broadcast and cable), program producers, advertisers and marketers, the market for

[1] The Information Please Almanac 1982, Hastings Press. Cable File 81, p. 36.

electronic entertainment signals is large and growing (Mayer, 1972). As used here, the multichannel programming environment denotes the set of audio program signals available to the audience at any time. Radio signals are electronic, highly sensitive to technological innovation, and deliver fleeting messages to the public.

The audience makes its choices from among several signals, each competing for the audience's attention. For example, very few FCC authorized channel allocations are left unfulfilled. In 1981, 4575 of 4694 authorized AM stations were on the air (97.5%) and 4358 of 4567 FM stations were on the air (95.4%). The trend in radio broadcasting is that soon after additional frequency assignements are authorized, stations are quickly constructed and licensed.[2] Complex regulation and coordination is required in broadcast telecommunication to avoid electromagnetic interference. Geographic and bandwidth limitations are both necessary to provide for broadcast radio market competition without allowing the growth of competing stations to drown each other out. The audience for these signals comprise the "electronic radio audience" for audio programming signals.

In the United States, electronic mass entertainment communication is predominantly commercial. These media are operated directly for profit. The station operator programs to a perceived audience. The size and the perceived buying power of the attracted audience of the attracted audience then contributes to advertising rates (Hall & Hall,

[2] Broadcasting Cablecasting Yearbook 1982, p. D-110.

1977). In order to maximize the size of the audience, a variety of programming tactics are used including music playing people like, offering news, commentary, and information. Promotional campaigns and contests are equally used to attract and maintain an audience. The station operator actively seeks to attract an audience (Hasling, 1980; Fornatale & Mills, 1980; Spitzer, 1980; Routt, McGrath & Weiss, 1978; Clift, 1978; Hall & Hall, 1977; Robinson, 1968; Taylor, 1967; Lazarsfeld & Stanton, 1944). The commercial aspect of radio broadcasting has served as a continual basis for criticism of the American electronic media system. Nonetheless, as is being continually witnessed, radio programming attracts large audiences (Fornatale & Mills, 1980; Hall & Hall, 1977; Routt et al., 1978; Seldes, 1950). How are these audio audiences to be distinguished from one another?

The general concept of an "audience" is fundamental in mass communication research. The audience is an aggregate of receivers who intercept a source's message. It is not necessary to assume that the source intended for any particular audience member to intercept the message. Rather, the message is placed before the public and those who desire to attend do so. The lack of a consensual definition for "audience" has been long recognized (Greyser, 1962). Bogart (1964), in a seminal article, considered the question: "Is it time to discard the audience concept?" Noting that the meaning of "audience" was varied, he suggested that a more precise definition be used in discussing an "audience" due to its multiple meanings. Further, Bogart noted, the multiple meanings of "audience" were not comparable across media,

audience data are intangibles, that preoccupation with audience size has led to erroneous decisions and energy has been deflected from more fruitful approaches in the study of audiences (p. 48). More recently, Blumer (1979) again recognized the current multiplicity of meanings for the "audience." Also, Corner (1979) mentions a concern over the loose usage of the concept "audience." Although these authors recognize that the concept audience needs definition, no general description has yet been firmly established. The mass media audience remains a general concept which roughly indicates "the set of human receivers that received a mass media message." While the goal of the present research is not directed to a thorough analysis of the audience concept, it is necessary to recognize that the meaning of "audience" is not explicitly established. One plausible interpretation of this ambiguity is that the concept audience is more accurately a construct, and thus it may encompass a range of underlying attributes or other variables. Elliot (1973) and Brown (1973) recognized that audience study is needed which might lead communicators to define their aims more precisely. In this manner, communicators can improve their receiver orientation and assess their message effectiveness through increasingly refined audience analysis procedures. Identifying characteristics of the radio audience has been of primary concern throughout the life of broadcasting (Cantril & Allport, 1935; Lazarsfeld & Stanton, 1944; Robinson, 1968; Fornatale & Mills, 1980). Each of these authors, during widely separated decades, has indicated the continuing need for research and identification of audience characteristics.

Audience, in the dictionary sense, denotes a set of listeners or spectators to a performance.[3] More technically for mass communication research, it denotes a set of television viewers or radio listeners.

The National Association of Broadcasters (NAB) defines audience as:

> A group of households, or a group of individuals, that are counted in a television or radio audience according tc any one of several alternative criteria . . . different operational definitions of viewing or listening result in different definitions of audience. . . . Because there are alternative criteria for counting households or individuals in television or radio audiences, any data on the size of an audience must be accompanied by a complete and careful definition of the nature of that audience (1973, p. 17).

Blake and Harrison (1975, p. 8) recognize that an audience is comprised of

> participants who, by their reception of the message (of what ever dimension) permit the communicative act to be completed, to have some kind of effect. . . . [audience] defines and allocates the categorical roles of the communicator (source) and communicatee (receiver).

This audience is a mass communication audience in that it is large and disperse. Wright (1975, p. 78) describes that mass communication is:

> directed toward audiences that are relatively large and heterogeneous and whose members are anonymous so far as the communicator is concerned.[4]

[3] _Webster's New Collegiate Dictionary_, p. 73.

[4] It is noted, however, that with interactive cable it is entirely possible for a cable operator, or the cable system's computer, to know the identity of audience households.

Friedson (1953, p. 198) realized the importance of the audience in mass communication research, in that it would be of aid to everyone should researchers:

> . . . participate in creation of a theory of mass
> communication by defining the character of the social
> enterprises that organize, produce and maintain mass
> communications and their media, and by defining the character
> of the human groups called audiences, or collectively "the
> audience."

Thus, according to Carey (1980), an adequate concept of the audience must include:

> the idea of social character, shared expectations and
> predisposing definitions . . . these in turn have a
> determinate effect, in conjuction with the institutionalized
> character of the activity, on what members of the audience
> select or do not select and how they react or do not react (p.
> 198).

In terms of audience program selections, research is needed to aid in detecting and identifying characteristics and attributes of the radio audience which surpass simple "daypart listening." Reliable measures of identifiable audience attributes that can be entered into testable hypotheses in relation to the shared expectations and social behavior are presently lacking. Many factors contribute to the actions and shared expectations of the radio audience. Society's forces are numerous and diverse and they influence all the members of the radio audience at large (Zaltman & Wallendorf, 1979; Siepman, 1950). The commercial radio audience is presently identified by age and sex demographics. No systematic syndicated data is collected as to other

characteristics of the radio audience, its program preferences, or the interrelationships among the program preferences. In addition, the format classifications that are used are dynamic and differ from one radio market to another. Most radio markets have more than 11 signals available. This means that more audio signals are available to the audience than current industry methods can distinguish the audience among them.[5] Specifically, industry data to not report on format or local audio program preferences. As a result, further understanding of the radio audience is inhibited by a lack of accurate and precise data that is descriptive of the radio audience. This is especially problematic for radio programming which seeks to attract and audience with programs that meet the public tastes on a local level (Quaal & Brown, 1976). Without data and procedures empirically identifying audience preferences, the radio programmer must rely on more subjective and error prone intuitive judgements of audience preferences (Johnson, 1970) because most trade research identifies audiences according to national category schemes which are not necessarily comparable from market to market. Radio research has not been energetically pursued as evidences by an absence of a Presidential Commission or broad based radio research grant funding. Thus, while television audiences have been studied extensively, the radio audience, particularly the local radio audience and its preferences have not been as fortunate as to be described by a comprehensive theoretical body of research. Thus the

[5] Broadcasting Cablecasting Yearbook 1981.

development and refinement of analytical radio audience methods are not necessarily a new problem, but nonetheless still a current problem.

Several authors have presented detailed historical reviews of radio and the radio audience (Fornatale & Mills, 1980; MacDonald, 1979; Schwartz, 1973; Barber, 1970). Radio is an active participant in today's audio environment. While the "golden age" of radio is in the past, radio has continued to diversify and grow, both in audience size and advertising revenues (Clift, 1979; Hall & Hall, 1977). Radio billings rose over 600% (to $2.9 billion) between 1955 and 1979. Radio billings recent growth alone between 1978 and 1979 was +16.5%.[6] As is known by every radio programmer though, is that gold is just a step toward platnium. Mindik (1957) reported that although radio could not deliver a single national mass audience since the advent of nationwide network television, radio still did reach vast cumulative audiences. The expanding reach of radio is regularly reported by industry trade sources such as the ARBITRON surveys. While it is well known that radio attracts huge audiences of millions of listeners, little is known about the characteristics of the radio audience. Radio has been studied in terms of where and when it is used, and by whom it is used, but not in terms of the audiences' preferences among radio's many services and alternative program formats (Fornatale & Mills, 1980; Troldahl & Skolnik, 1968).

[6] Broadcasting Cablecasting Yearbook 1981, p. D-110.

Schwartz (1973) proposed that the audience, rather than receiving messages from the radio, receive a signal that causes to reverberate within them some information they already have. Schwartz suggests that radio is misunderstood because people try to analyze it as though is simply delivered a message, rather than catalyzed an interaction between the stimuli on the air and the data already stored in the minds of the audience. For example, the popularity of the Top-40 programming style, and people's "favorite songs" which causes listeners to turn up the volume of the radio suggests that one of the most attractive features of the song is that is has been heard before. Also, such contemporary radio news services as The Source, Earth News, and Zodiac present information with an "underground" or counter-culture slant, which some programmers believe is particularly attractive to their listeners. Likewise with musical programming as can been seen in the age stratification in radio audiences in that Top-40 is youth music and the songs and the lyrics are a central focus of attention of many youth while the music of the big-band era primarily is attractive to audience members over forty years of age. Current methods, while tallying these audience age-sex distinctions, provide no data which can further an understanding of the underlying attributes of the attraction of these programming styles and also do not offer refined measurement procedures for accounting for overlaps and mixed preferences, as would be seen by the audience member who is attracted to both top-40 and big-band formats.

As has been recognized, only minimal data exist that are suggestive of attributes of the audience (Hasling, 1980; Quaal & Brown, 1976). Troldahl & Skolnik (1968) examined the meanings that people have for radio. Two dominant aspect emerged, companionship and programming evaluation. No data were reviewed by these authors that dealt with the preferences of the audience for alternative programs within the program evaluation category. This indicates that the audience finds companionship in radio programming and that the audience has its own opinions about the programming to which they are exposed. Ruffner (1973) indicated that the female rock radio audience itself could be further subdivided into at least four types of prototypic listeners. And, as reported by Dominick (1974, p. 161), Weintraub found that a verbal personality factor that was absent in adults accounted for the largest portion of variance in a teen sample. This suggests that the characteristics of the audience are quite varied and unknown. Troldahl and Skolnik noted that their data indicated the presence of an aesthetic and entertainment function for radio, yet the preferences of the audience are intangible and subjective (1968, p. 64f). People like music, and this creates a dilemma for the radio programmer. This is because audience tastes are hard to define and are constantly changing, rarely researched and hardly ever communicated among competing programmers (Routt et al., 1978; Lazarsfeld, 1946). Johnson (1970) suggests that music is the primary reason people use radio but also notes the difficulty in identifying tastes among format types within the overall radio audience. Owen (1977) contends that there is no empirical

evidence on the distribution of audience tastes. The range and underlying factors of audience preferences among musical formats remains unidentified. These factors provide the background for this dissertation in that a central problem has been identified in that in order to further examine radio format preferences it is necessary to develop methods which can detect underlying relationships among formats and the audience preferences. The multidimensional methods, discussed later, are one set of measurement and analytical procedures which may contribute to this effort.

Commentators on radio programming acknowledge the importance of radio audience research to aid in understanding the audience and their program preferences (Taylor, 1967; Robinson, 1968). Fornatale and Mills (1980) say that radio audiences are difficult to rate due to the methodological problems of current diary and telephone coincidental measurement procedures which yield faulty data. Schultz, Block and Custer (1978) also identified weaknesses in current audience estimating procedures in that they yield widely different estimates of station share of the audience. And yet, even based on suspect audience data, programming and advertising decisions are made. Not only are current audience data insufficient, but the information yielded by these data does not address substantitive issues in audience research. For example format preferences are inferred from these audience size figures but identification of subgroups that are format or station loyal and those that prefer mixed formats and various stations is lacking. At present, methodological tools have yet to be introduced for assessing format

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preferences such that these considerations may be approached.

The radio audience contains many smaller audiences of distinct tastes and interests. What is needed, in part, is a way to identify these subgroups of interests that are present in the radio audience at large (Surlin, 1977). While current audience research data are informative in regard to the standard age-sex categories commonly used, further research is needed to identify the "fragments within" the radio audience, particularly within the 12-34 year old bracket (Hall & Hall, 1967). As indicated by these authors, current audience ratings indicate the general audience in a category, but are uninformative as to the subgroupings within a category. Not all stations seek to engage in audience research. Surlin (1972) reports that less than one-fourth of the black-music stations he surveyed recommended the use of research. This is interesting in that the same author found in 1977 that race is not informative as to media involvement and is of limited use for predicting audience tastes beyond a specialized "focused youth" typology for some listeners. Nonetheless, as noted by numerous other authors, radio research is vital to many stations (Quaal & Brown, 1976; Hall & Hall, 1977; Robinson, 1968). Dominick (1974, p. 169) contends

> Much of the research done during the 1940s and early 1950s, when radio was in its ascendency, is outdated now and of little social utility. Not only has society changed, but radio itself has become radically different. The proliferation of locally oriented stations, the variation in formats, and the increased popularity of the FM band have created a radio system quite different from the one that existed twenty or thirty years ago. Radio, as it stands now, is a new communication medium and, as such, deserves detailed study in its own right.

Quaal and Brown (1977, p. 142) comment on the need for the development and refinement of audience measurement procedures:

More than measuring households, research must concentrate on individuals. The multi-set homes in both radio and television involve varied selections of programs. The increase of UHF and FM stations should mean an expanded competition resulting in greater audience selectivity. In the future, information concerning predefined groupings of people will be needed by advertisers. The coming fractionalization of the total mass audience by multi-sets and more stations may itself condemn a system which equated success with the largest audiences.

AM and FM stereo broadcasting alone have brought bountiful enhancements to the entertainment media. As more stations have become available for broadcast licensing (as noted with the growth of FM and recently authorized stereo AM), new stations quickly emerged (Hall & Hall, 1977). Additionally, with technological advancement, radio continues to adapt and grow (Fornatale & Mills, 1980; Heron, 1982). With the rapid development of cable communications for audio and video program delivery there is a fresh opportunity for audio market expansion. At present, most cable systems carry FM audio programming signals.[7]

Carey (1980, p. 6) in a discussion of changing communications technology and the nature of the audience, cites the pamphlet "The Communications Revolution," by the National Citizen's Committee for Broadcasting, which states:

[7] A comprehensive report on broadcast and cable radio audio formats is presented in Television Radio Age, August 10, 1981, pp. 35f, 104.

> The revolution in communications technology is about to yield hundreds of new broadcast networks -- each geared to very special audiences. Whole networks for children, for senior citizens, for the deaf, for minorities, for sports fans, movie fans, news fans, . . .
>
> Superstations that beam programs all over the globe by satellite.
>
> Cable hookups that will let you choose from dozens of stations, hundreds of programs at the push of a button.

In addition to this commentary, Carey (1980, p. 9) notes that:

> Satellite and cable, particularly in combination, allow for the assemblage of even more massive audiences and to amass them increasingly without respect to national boundaries. The same technologies allow for disassembling this audience and grading it more finely into segments.
>
> This two-dimensional relationship -- the formation of the mass and creation of the segment -- represent centripetal and centrifugal forces in the development of modern social structures.

Continuing technical advances will likely foster more variety in programming, with numerous new programming suppliers emerging into the market (Rolfe, 1980; Bittner, 1980). Bogart (1973), in noting the technical impact of multiple channel availabilities, suggests that the communications perspective must be broadened to encompass the coming range of program diversity and the selective attention of the audience. The enhancements in channel availability provided by technical advances has led to a call for an explicit focus of research directed to assessing the impact of these technical changes on mass communication (Katzman, 1978; Parker, 1973). Ray (1973) suggests that the application of behavioral science research methods to audiences is an appropriate

response to the technical advances in telecommunication technology.

The fewer the program options, the simpler the segmentation process; when no options are available (only one signal source), segmentation is simplified -- there can only be a single segment, the total audience. As the number and variety of signal options increases, the process of segmentation becomes increasingly complex.

Carey (1980, p. 6) says

> as channel capacity increases, as satellites allow simultaneous transmission to wider areas, the new audience will be segregated by levels of taste, hobbies, and avocations, by political preference (taste would be a better word) . . . . While some of these segments represent historic cultural categories, they are themselves decisively transformed by the process of audience segregation.

To the advertiser and the programmer alike, audience segmentation (or, in Carey's terms, "segregation") is of importance. Should the marketer and advertiser ignore characteristic differences which can be detected within the consumer market, then much energy and many messages may be squandered. The cost -- in terms of message effectiveness, financial criteria, and time -- of reaching a target market for the commercial programmer is increased by messages that are extraneous to the target market. One useful approach would define audience segments in a manner that affords reaching a target market easily and efficiently, with only limited spill-over to a non-target audience. The programmer as well seeks to identify segments for programming in order to provide programs tailored to the public tastes. In this case, the program source is programming to a "perceived" audience (Surlin, 1972). That is, the programmer presumes an archetypal market potential of

listeners in the local market for the station's program offerings. Commercial broadcast advertising is based on numerical estimates of audience size, provided by independent syndicated audience research services. The current lack of data for the audio audience, as distinct from the age-sex classifications, is problematic for the programmer in that no data are available to directly format programming decisions, and it is confusing for the advertiser because multiple radio placements may reach the same demographic profile of listeners, but not selectively reach those who are prospects for the advertiser's client ,due to national/local as well as format/station overlap. While this is sufficiently informative for industry management, it falls short of providing research that forms a basis for theoretical development.

Thus, audience research is needed that will allow the identification of audience preferences and selections among competing radio stations programming similar formats. Not only is this needed to meet current research demands, it is further underscored by technological advancements in audio program delivery. What is necessary is research that can aid in detecting and identifying attributes and characteristics of the audio audience's preferences that serve as a guide to program selections. Presently used procedures for audience assessment are simple nominal indicators of listening, with no attempt to examine the characteristics of the audience preference or selections. This situation has not allowed the development of research and the identification of critical variables and constructs relevant to radio audience analysis. Given the methodological weaknesses of current

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audience accounting procedures, more accurate techniques to research radio listening and format opportunities are needed. This dissertation seeks to contribute to this end.

Radio Programming

As used here, programming denotes the message content over the communication system, and the decision process which brought it there. Programming customarily refers to the program selection and scheduling by a. broadcast outlet. The "*format*" of the programming is identified according to stylistic and content characteristics of the programs carried. Notably, however, is that the National Association of Broadcasters (NAB) has neither provided nor indicated any definition for programming or format.

After the radio soap operas were discontinued and television ascended to such widespread popularity, radio stations began to specialize in the types and styles of programs they offered. Many radio stations turned to music and maintained audiences by broadcasting "home-team" sporting events (Routt et al., 1978). Stations compete by offering programs thought to be attractive to the audience. A listener can then select from the set of available audio offerings. The formula to the programmer is simple -- provide the most attractive programs to the largest audience. The emergence of the format concept in radio was rapid after its early 1950s initiation. Its growth demonstrated the presence of sub-audiences within the radio audience at large for programming suited to distinct tastes. Programmers selected material

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which was thought to meet the preferences of an archetypal audience. This is now termed a target audience (Hasling, 1980). This approach to radio modified the traditional competitive framework of the radio marketplace. With format radio, stations used their formats to compete with each other for a share of a select target audience, such as teens. Thus, the emergence of format radio in the early 1950s, along with the emergence of rock and roll, operates on the assumption that the radio audience at large can be subdivided according to extant audience preferences. This is illustrated in the market where two top-40 rock stations compete for a share of the youth audience or the teen market.

However, the audience selects the programming to which it attends, it is not

> wholly a free agent: It must select from what is offered. But even here, the audience has influence, since it is generally offered an array of communications to which it is believed it will be receptive (Bauer, 1974, p. 327).

The audience is an "aggregate of minorities" who attend to the messages on the public media system (Carter, 1968). The attention of the many audiences of distinct tastes are sought by competitive programming. Programs are presented tht programmers anticipate will be attractive to the interests among the audience (Smith, 1972; Taylor, 1967). With an increasing assortment of audio offerings, programmers attempt to attract an audience by providing program fare which is attractive to increasingly specific audience tastes. Programmers seek to attract listeners who have interests and tastes that are not met by competing audio programming outlets (Taylor, 1967; Lewis, 1970; Surlin,

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Programming, then, requires identifying and anticipating audience tastes and then providing programs which the audience will select. General categories of the programming thus designate the format, or style, of the programming. In radio, both musical and non-musical formats are common with each of these format types having further subdivisions (e.g., musical formats of rock, jazz, and top-40). As noted by Greenberg and Barnett (1971), programs can be categorized into types, and audience preferences are distributed unevenly over these types. At present, a wide variety of radio formats are in use. At present, the tastes of the public are evolving. This is quickly illustrated by the emergence of new musical types with each generation. Whether the music is considered as "cool jazz" or "bebop" or "rhythm and blues" or "rock and roll" or "punk" or "new wave," musical experimentation has not ceased. Thus new musical formats continually emerge. The times and the social context of entertainment programming also continually changes.

With a wider array of channel options, programmers seeking specific audiences can provide program fare which is attractive to specific and identifiable audience tastes. This is common in FM radio, which has seen a clear emergence of specifically tailored formats. Maisel (1973) has noted that successful media are becoming more specialized. For example, most radio markets have top-40, easy listening, country-western, rock, and pop music, among other radio signals. Presently, radio supports numerous alternative formats which encompass

all-news, all-talk, just jazz, classical, country, and ethnic music, among others. Each station, while not seeking to gain the largest possible audience from all possible receivers, instead seeks to reach those to whom the programming fare is most attractive. Programmers can then explicitly present programs which cater to particular audience tastes.

Formats are recognized as elusive and intangible within which are found all sorts of variations (RTVA, 1981). Commonly, formats are ambiguous labels which vary widely in meaning from one radio market to another (Routt et al., 1978; Hall & Hall, 1977; Quaal & Brown, 1976). Even with classical music, for which wide agreement is found, this format can be further subdivided in terms of light or heavy, vocal or instrumental, 19th or 20th century, and other distinctions by which the music appeals to the audience. As Hesbacker (1976, p. 110) noted,

> listening traditions in a market are the audiences attracted
> to sound formats independent of the stations broadcasting
> them.

Thus, Hesbacker recognized, with sound attracting audiences, and audiences attracting advertising, and advertising providing financial success, contemporary radio is moving toward "specialty audiences" which are drawn to specialty formats (p. 110).

Quaal and Brown (1977 135) have noted that:

FM radio has started to become a profitable broadcasting service with sizeable and loyal special interest audiences. It has proved its ability to reach the quality audience on the local and the regional network levels. Nationally FM radio attracts one-third of the total radio audience, and even more than that in some major markets.

Moomey and Skolnik (1970, p. 465) recognized that the classification of target audiences and programming formats was the most frustrating methodological problem facing the broadcast information and entertainment industry. Most audience ratings and consumer market product usage services are keyed to national markets and national marketing techniques. Radio, in contrast, is predominantly a local medium. Rather than provide the same programming at the same time to a nationwide audience, the radio stations appeal to local tastes at local times. Rather than a live national performance or production, prerecorded records and tapes, or local listeners on talk shows provide program content. With national networks, programming is distributed from one central location to outlets throughout the country. With radio, each station in each market has its own library of program materials. While local radio stations do use network services, these are usually for news, sports, or weather rather than for the dominant programming fare of the station. Hence, the music that is played over a local radio station is programmed to appeal to local tastes. The national audience is not a consideration. This is a problematic situation in that the Target Group Index, which provides a comprehensive crosstabulation of purchaser characteristics according to media exposure is national in scope. Consequently, the data provided by the TGI for radio formats are of limited utility in that national characteristics and labels are used for audio formats which may differ very greatly from one market to the next, and a wise radio placement of advertising in one

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market may be useless in a different market even though the format designation is the same in both.

Format categories and labels are rough, and often arbitrary. Owen (1977) commented that the approach appears to have been to construct some finite number of theoretical formats, in which set of procrustean beds each station in a market must lie (p. 313), and made to fit, whether or not the label was applicable. Most writers about radio discuss the role of formats in contemporary radio, and each provides their own definitions and descriptions of current radio formats (cf. Fornatale & Mills, 1980; Hasling, 1980; Routt et al., 1978; Hall & Hall, 1976; Quaal & Brown, 1976; Robinson, 1968; Taylor, 1967). A sampling of author's formats follows. Taylor (1967) recognized the following formats for radio: news, public service, modern, country, beautiful music, FM-progressive, and sports. Dunn (1972) used a more extensive set of radio format types. His schema included: mystery-drama, general drama, classical music, semi-classical music, pop music, comedy & variety, news, discussion, sports, and religious programming. Tull, Johnson, and Sweeney (1978) designated the radio format spectrum as encompassing: news, beautiful music, MOR (middle-of-the-road), live progressive rock, automated rock, top-40, all talk, and "other." Rostow and Rasby (1980), in a study of U.S. Latino use of radio, noted that listeners had preferred formats, including Spanish language, contemporary, country, MOR, talk, beautiful music, news, and jazz.

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Routt, McGrath, and Weiss (1978), in discussing the radio format conundrum, noted that formats need to be geared to both the times and the service area. These authors provide a comprehensive format classification which includes: Country & Western, Pop/Adult, progressive, top-40, Rhythm & Blues, soul, MOR, ethnic, progressive/rock, contemporary rock, gold/oldies, good music, gospel, jazz, blues, album rock, Nashville sound, Underground sound, bluegrass, and progressive country. Non-musical radio formats, they continue, most notably the information all-news and all-talk formats, are also popular in contemporary radio.

Neither is there agreement among the commercial audience and product usage reporting services in regards to audio programming formats. The Target Group Index (TGI) volumes cover the consumer product spectrum and were fundamental in advertising media planning until Axiom Research ceased their publication. TGI classified musical formats as heavy rock music, top-40, golden oldies, poular music, standards, mostly instrumental. classical and semi-classical, modern country music, talk programming, all news, Black programming, sports, farm programs, radio drama and religious programs. The Simmons media and product index (now the TGI equivalent) by Market Research Bureau uses a different set of radio formats to describe radio audiences. The Simmons collection is all news, album oriented rock (AOR), progressive, beautiful music, Black, classical, contemporary-disco, country, golden oldies, middle of the road, religious, soft rock and talk. The ARBITRON format categories are Contemporary which includes top-40, disco and

mellow; Rock, which includes album and progressive; Good music, MOR; country; news; Black; talk; classical; oldies and Other (Clift, 1979, p.125).

Formats are of interest to advertisers as well as to programmers. Advertisers assume tht a format delivers an audience of specific age-sex demographics (RTVA, 1981, p.35). Advertisers recognize the need to more precisely identify the audience for varied formats and a means to discriminate among the audiences of competing stations (Clift, 1979; Robinson, 1968). This is particularly significant for musical formats. The compatibility of music to the audience's tastes has been found to influence the evaluation of the message source. Incompatible music leads to a lower evaluation of the source (Simpkins & Smith, 1974). While radio formats can thus be used to reach particular audiences, the musical format of a station can greatly influence the perceptions of a commercial. The basic issue, however, is not the programming of any particular station, but the matching of programming to audience tastes in the radio markets. This is for commercials as well as programming. In order to do this, format preferences of the audience must be identified. In particular for stations featuring a musical format, the musical format preferences of the audience of the market are the central concern for financial success. Without refined knowledge of the audience's preferences among formats, the programmer and the advertiser could either miss his or her target audience, find them and provide listenable commercials, or drive the audience to tune to a different station, and never know the difference. At present, no information is

available to indicate to the programmer, or the advertiser, what is happening to the audience.

The radio format conundrum to Routt et al. (1978) is that formats need to be geared to the time of day, the service area, and prevailing social traditions. Yet, objective research to aid in matching format with markets is lacking. Also, the number of distinct programs available in the radio market is not comprehensively distinguishable among similarly labelled stations within a market. Hence, there is no current way to distinguish among similarly demographically profiled or format labelled stations. That is, direct station to station competition within format type is unaddressed by current audience analysis procedures. This is problematic for both the programmer who seeks to attract a specific audience, and for the advertiser who desires to reach a specific audience. At present, operationally linking the goals of the programmer and of the advertiser has not been well accomplished. Further, this situation underscores the need for systematic academic research directed to the identification of mechanisms with which audience attributes and preferences can be studied.

What appears to be a central difficulty with the desire to program to the audience is that current methods of audience analysis provide insufficient discrimination among the tastes in the general mass audience. Thus, precise distinctions and attributes of the audiences attracted to unique formats remain undetected. In short, current audience identification procedures are uninformative to the programmer

or advertiser as the likely characteristics of the audience for different radio stations. As indicated by this review, many format labels are in use and markets have competing stations using the same format label. In general for the station sound as a whole, the format is musical (e.g., country or jazz) or nonmusical (e.g., news or talk). Within these general categories, much finer distinction can be made. Light classical, heavy classical, orchestral, or chamber music are each distinctions within a single musical format. The number of distinct formats rapidly multiplies from this point on. As indicated, the number of audio offerings is large and growing, yet they are offered by a programmer to a target archetypal audience to which he or she is uninformed as to the audience tastes and preferences. This has not been alleviated during the past decade (Fornatale & Mills, 1980). This research is directed to an exploratory analysis of a multidimensional approach to this problem.

Audience Format Preferences. Preferences for program types and formats have long been recognized (Taylor, 1967; Monahan, 1964; Routta et al., 1977; McLeod, Atkin, & Chaffee, 1972; Cantril & Allport, 1935; Williams, & LeRoy, 1976). Darmon (1976) found that preferences were embedded in broadcast channel loyalty because of the propensity of the stations to schedule definite program types. The audience chooses among the media offerings (Bauer, 1963). When audience members are offered programming that meets their taste and suits their schedule, they tune in. Yet, radio audience analysis procedures do not directly include data indicative of format preferences. Without information regarding

audience format preferences, the programmer is unable to identify the potential acceptance of a new or modified audio format. If a programmer could empirically calculate anticipated risk factors from programming a modified station format, then the likely impact of alternative formats and program mixes can be weighted against each other prior to being transmitted (Haslin, 1980; Hall & Hall, 1977). Then a format modification can be made which has a calculated relatively high chance of acceptance. The concept of format opportunity has been shown to be applicable to media market analyses, based upon standard market demographic variables (Pettelle, 1981). Format opportunity has yet to be based on the preferences of the audience. This is due to a lack of data and applicable methods for these analyses.

The characteristic behavior of audience members is selection among media offerings (Blumer, 1935). The audience is made up of "individuals who demand something from the communications to which they are exposed, and who select those that are likely to be useful to them" (Davidson, 1959, p. 328). For example, political audiences are usually drawn from like-minded political spectators (Sears & Freedman, 1967). Comstock et al., (1978, p. 488) identified special populations among the audience. An analogous example can be drawn from cable television. As noted by Jeffres (1979, p. 167):

> With the increased number of choices provided by cable TV, consumers are faced with a change in the decision making situation and increased selectivity would be expected.

It has been repeatedly shown, however that the mass communication audience is hetereogeneous, and that audience members have different tastes, patterns, and uses of the mass media (Comstock et al., 1978; Blumer & Katz, 1972; McQuail, 1972; Sobel, 1976). Audience preferences are known to be differentiatable based upon levels of liking (Carey, 1968), expressed preferences (Gans, 1977; McQuire & LeRoy, 1977), lifestyles (Eastman, 1979), working schedules (Nayman, Atkin, & Gillette, 1973), and interest levels (Robinson, 1974; Lowry, 1971). One of the early approaches to subdividing the audience into a number of subgroups was done by Steiner (1952) in which he classified hypothetical television viewers into groups with internally homogeneous tastes. The critial variable in Steiner's study was "satisfaction" with the television programming. Satisfaction was taken as an indicator of program preferences, but the range of competing preferences, as distinct from the range of distinct program offerings, was not developed. This approach was later refined by Rothenberg (1962) in which he relaxed Steiner's assumption that viewers only watch their first preference program, thus allowing an initial basis for examining competition among viewer preferences as distinct from the available program offerings. Both the Steiner and Rothenberg approaches were primarily economic models of television program selection in which the actual concept of preferences were inferred but not directly measured. The interest of different audience members was not directly addressed.

The development of the "interest based segment" concept in audience analysis is useful (Frank & Greenberg, 1979). Audience interests, i.e., identifiable preferences, are useful to supplement the equivocal value of demographics in identifying target audiences (Tull, 1978). Interest-based segments are useful for two primary reasons: (1) the opportunity to develop and monitor audience attraction policies; and (2) the opportunity to especially develop programs, programming formats, and program scheduling to meet audience preferences. As indicated earlier, the growth of Black radio programming illustrates this (Surlin, 1972).

Interest based segments are increasingly important with expanding program availability. When audience choice is absent, supplier leeway is maximized (Gans, 1980, p. 68). With numerous options choices are present and audience members may select among any of the offerings by their interests or whims (Jeffres, 1978). Guttman and McCanaughty (1978) echo others in that research is needed on comparative program types and the preferences among audience members for alternative formats. A closely allied topic in marketing communications is concerned with understanding consumers' brand preferences among competing brands within a product category.

Brand preferences are used to divide consumers into smaller "target markets" who select one or another competing brands within a product category. Brand preferences are a central topic in marketing communications (DeLozier, 1976; Nickels, 1980). The brand preference model has been demonstrated as applicable for forecasting broadcast audience shares and can be used as a cost cutting guide for advertisers

in effective purchasing of TV spots to each desired target audiences (Zufryden, 1976). Brand preferences have been shown to influence the selections among competing brands of products on the basis of aesthetics and images (Sewall, 1978), attitudes concerning related images of brands (Bass & Wilkie, 1973), and the various images of the self-concept that are deemed related to the brand (Green, 1969); and media selections in the competitive radio market (Ginter & Pressemier, 1978). Thus, the success of branding suggests that assumptions of homogeneous perceptions and preferences within the total market are unwarranted. Yet, within the market, homogeneous subsets can be identified in terms of their preferences for one brand or another. As a consumer can be subdivided into segments, each relatively homogeneous amongst themselves when compared with the general consumer market. As indicated earlier, the mass audience is also highly hetereogeneous, yet specific format preferences are present in a media market. Most musical formats, for example, are quite homogeneous when compared with the music on differently formatted stations. This is demonstrated throughout the United States, where from one media market to another, one top-40 station sounds more similar to a top-40 station from any other media market, than it does to a local MOR station. This suggests that relatively homogeneous subgroups, or segments, may be identified within the listening audience as well. Thus, marketing segmentation based on brand preferences is an applicable technique for segmenting the consumer audience into target audiences (Hasling, 1980).

Market Segmentation

This concept is widely used in marketing and advertising. It is useful in the present research because (1) it provides for a method to subdivide the audience into smaller and distinct subaudiences; and (2) marketing research has established methodological procedures for addressing segmentation problems. Specifically, a market segment is a set of persons who are targeted as primary consumer prospects (in marketing) or targeted as a primary audience for persuasive messages (in advertising). Market segmentation is useful in that it allows the division of the large mass of consumer interests and opinions into smaller, more specific and homogeneous groupings (Kotler, 1980). The underlying assumption of market segmentation is that the overall heterogeneous mass of consumer interests and opinions can be subdivided into smaller and more homogeneous and specifically identifiable subgroupings (Kotler, 1980). This is the same problem facing audience analysis. That is, how is the large heterogeneous audience most effectively subdivided into segments. What are these audiences? Who should the programmer seek? Who does the advertiser want to reach? These are the concerns of audience segmentation.

Segmentation has received widespread application in marketing. Since Wendell Smith's (1957) pioneering article, market segmentation has enjoyed wide application and has spurred substantial academic research. Several excellent reviews are presented by Wind (1978), Foster (1972), and Frank, Massey, and Wind (1972).

Market segmentation has been defined as the following:

> The strategy of market segmentation is defined as the development and pursuit of different marketing programs by the same firm and for essentially the same product for different components of the over-all market. The choice of segmentation as a strategy is predicated on the assumption that the market for a particular product is composed of segments with somewhat different (perceived) needs and wants. If these segments can be identified, then it may be possible to develop a marketing program for each that corresponds to its requirement. (Frank, Massy & Wind, 1972, p. 15).

Thus, marketing communication involves the process of subdividing the consumer audience into smaller yet more homogeneous target subgroups, which can be addressed as a whole and who in themselves are relatively homogeneous when compared with the overall non-segmented consumer audience.

> Market segmentation is a means of identifying emerging opportunities as well as existing market opportunities. In both cases market segmentation involves a "breakdown" of a hetereogeneous market into smaller submarkets which are generally homogeneous with respect to a predetermined variable for set of variables (Green & Tull, 1974, p. 275).

In order to designate segments, Foster (1972) explains market segmentation is

> achieved by classifying customers into smaller groups who differ from each other in marketing susceptibility or product interest. Market segmentation, therefore involves dividing the larger hetereogeneous parts in order to satisfy the needs for each segment with more precisely fitting products or services (p. 63).

Market segmentation is vital in the development of marketing communication strategy. Nickels (1980, p. 276) notes:

> Marketing factor segmentation further subdivides the market into groups responsive to different promotional factors such as price, product quality, and branding. The last technique enables promotion managers to design messages that give consumers the kind of information most relevant to them.

Nickels goes on to note that this communication task is further complicated by the fact that an organization has multiple audiences to influence, and that it is sometimes difficult for communicators to empathize with their target audiences, due to wide differences between the communicator and the audience in socio-economic, ethnic, religious, and other lifestyle factors. This has implications for programming and advertising. For the programmer, this means that opportunities for both new and modified formats can be identified and tailored accordingly. Markets are commonly segmented according to age, sex, income, education level, occupation, education level, location of residence, religious preferences, political affiliations, product usage and brand preferences. These are usually measured unidimensionally. By attempting to identify and reach product and brand user stereotypes who differ according to social class (Munson & Spivey, 1981), buyer behavior (Kotler, 1980), and brand preferences, the audience analyst's task is complicated. In order to reach the market segments, marketing communication involves the process of subdividing the consumer audience into smaller yet more homogeneous target subgroups, which can be addressed as a whole and who in themselves are relatively homogeneous

when compared with the overall non-segmented consumer audience. DeLozier (1976) noted that receiver factors are important in the consideration of the marketing communication process, specifically the aspect of interest. Receiver factors are important for segementing the audio audience according to format preferences. This parallels the notion of "interest-based" audience segments.

Market segmentation assumes that the mass market is comprised of numerous members who can be categorized according to a limited set of attributes. They serve to identify them as a target market. A target market's members are also members of the local or national broadcasting audience. For advertisers, knowledge of identifying characteristics of the audience makes it is easier for a source to be sensitive to receiver attitudes and musical preferences. In advertising media planning, it is desirable to reach specific, not general, audiences (Sissors & Petray, 1974, p. 6). While this is desirable, it is also difficult. As indicated earlier, no methods are currently available to approach this problem. Not only is there an absence of methods for audience segmentation, there are no measures of audience homogeneity within a segment that are currently reported in the literature.

Product differentiation is common in marketing; yet, audience differentiation has only drawn minimal research interest. Audience differentiation requires matching target markets with target audiences, in order that by "dividing a hetereogeneous market into homogeneous subsets, we can design individual marketing strategies for each segment" (Winter, 1980, p. 61). The Simmons media volumes and Target Group

Index provides indicators for audience and market segmentation by household members' product usage, media exposure, demographics, and psychographics. With these data, product users can be addressed by message campaigns carried on the media to which users frequently select. This enables a planned high-likelihood probability of message exposure for this target market of prospects. Thus, members of the media audience can be targeted more specifically. This allows for the development and refinement of message differentiation; i.e., the design and articulation of message campaigns specifically tailored to reach particular categories of persons in the audience who are attending to their preferred radio station format. Message differentiation has been recognized as important in this segmentation process:

> while product differentation is accepted, message differentiation is equally relevant but less thoroughly understood . . . [we] need more refined knowledge of potential audiences (Bauer & Greyser, 1969, p. 8).

Foster (1972, p. 63) comments that segmentation has several benefits in that it allows:

(1) Spotting opportunities quickly,

(2) Planning and launching more effective highly selective marketing campaigns with greater precision in resource allocation;

(3) Product marketing activities aimed more accurately at the characteristics of each segment;

(4) Gauging consumer needs against current competitive activities.

Market segmentation can thus contribute to audience segmentation. First, within marketing communications and media planning, it is desirable to match target markets with target audiences (usually with commercial promotional messages). Second, the radio audience comprises a market in itself for programming services in which the audience is distributed according to their format preferences. In the competitive media market, market segmentation has substantial promise as an analytic and heuristic procedure. By using segmentation procedures it is feasible to examine the relative market positions of competitors' formats and segments on a segment by segment basis, such that market response and advertising strategy can be carefully and precisely targeted to optimally address the identified segment (Barnett, 1969; Starr & Rulumson, 1978; Claycamp & Massy, 1968; Young, Ott, & Fergin, 1978; Carman, 1965). This concept can be extended to audience segmentation by attempting to match target markets with target audiences. This allows identification of the market potential for distinct audio programming signals in the competitive radio market. In this manner, programming is a consumer service in itself. In targeting prospects for a new product, Kotler and Zaltman (1976) recommend that the "task is to define, at the time of launching, the value of different prospects for a new product" (p. 11). It is the task of marketing communications to distribute "images that coalesce into markets" (Goldsen, 1974, p. 77). For audience segmentation, this suggests that the task is to define the value of different prospects for a new format or program mix. Similarly, advertisers would want data that are

descriptive of the consumer characteristics of the attracted audience.

Segmentation is a convenient labelling device. It designates both idealized and practical aggregates whose profile on selected attributes matches a marketing objective. A segment is a grouping of persons, or consumers, or audience members, which have been classified as sufficiently similar amongst themselves to warrant a common label; a segment arises by detecting and reliably discriminating patterns in a total aggregate. Segmentation, then, is a process of labelling distinct groupings which have been identified as similar by a measurement procedure. From the programmer's perspective, the set of audio signals in the radio market can be described as the products and brands of available radio programs. For example, the jazz audience could be expected to purchase different 33rpm record albums from the top-40 devotee. A segment affords the opportunity to specifically tailor programming, message strategies, new products, or ideologies expressedly catering to distinct audience segment tastes. Programmers, and others who want to use the electronic forum for promotional, religious, public service, or other other persuasive purposes, seek those who will most likely be rallied to their calling. With audience segmentation, promotional campaigns that are more "receiver oriented" can be executed and the audiences' tastes can become a more empirically identified aspect of program decision-making.

A marketer can direct promotional campaigns toward those members of the consumer base who are most likely to be receptive to messages referring to a product or service, in that receiver usage patterns have been previously identified, and that the media exposure patterns of the target have been identified. Thus, the advertiser can more easily estimate efficient media vehicles by which a target audience of consumer prospects can be reached. In this manner, those consumers most likely to have a taste for a program format are able to be singled out as a class and then attracted with tailored programming and addressed with well targeted promotional efforts. The problem then is how are audience segments to be identified and designated.

Product usage factors are also used to identify market segments. For example, the Target Group Index (TGI) is a comprehensive data base which crosstabulates a large sample of American consumers according to the levels of product usage (heavy, medium, light), brand loyalty, media patterns, and self concept psychographics. From these data, inferential projections can be made to the consumer population of the coterminous 48 United States. These figures are used to assess the most likely prospects, or target market, for advertising and promotion, and the media which will most effectively and efficiently reach them. In this case, segmentation is based on usage patterns, both of products and the media.

Segmentation is frequently accomplished by using consumer's preferences for brands in distinct product classes. From this perspective the key aspect of the consumer segment consists of the identifiable program preferences that consumers have. This concept can be extended to audience analysis as the process through which audiences program preferences can be identified and then target audiences can be designated. Of central interest in further audience research is then to develop a method for identifying characteristics of the audience or for designating audience segments according to the formats that they tune in. An audience segment can thus be constructed according to alternative criteria, including but not limited to demographic and preference procedures. For present research, the musical format preferences of the audience are to be further investigated such that the feasibility of distinguishing audience segments according to programming formats may be assessed. What is currently needed is the development of procedures to more closely discriminate and designate specific prospects for formats. With such procedures, programmers, researchers, marketers, and advertisers can more efficiently identify salient aspects of audience preferences such that they can be met. For the commercial programmer, this affords an additional indicator to be used in designing programming for a target audience. For the non-commercial programmer, this would allow a method for planning program content on a communication system such that the variety of extant audience interests can be economically met. This is particularly valuable in music programming where the art form itself as well as the electronic medium

that carries it are both highly sensitive to technological advances.

New musical forms continually emerge. The times and the social context of entertainment programming also continually changes. These situations alone are only part of the story. Of dramatic importance is the expanding capacity of communication systems to provide programming that is attractive to diverse groups within the audience. Not only do public tastes change, but the fragements frequently listen to one type of format and ignore many others (Hall & Hall, 1977; Surlin, 1977). With changing tastes and preferences and increasing diversity of available programming, it is necessary to both develop and refined schemas for identifying format preferences in the competitive multichannel audio environment such that audience tastes can be anticipated, and the acceptance of varied programming can be predicted.

This review has found that radio attracts audiences of millions and attracts listeners from the public by offering distinct radio programming formats. Through competitive play, radio stations program musical and non-musical formats and schedule their programs and features to attractive a greater share of the available audience then any of the competitors. Radio air sound differs widely from market to market but the same common format labels are used throughout the nation. Commercial audience and market analysis procedures are basically national in scope. Radio, in contrast, is primarily directed to meet local tastes. As repeatedly indicated by numerous authors research is needed which is descriptive of the audience and their selections.

This review finds that research is needed to address several important but interrelated problems in understanding the radio audience. Research must be executed to identify format preferences of the audience that can discriminate among these preferences more clearly than currently used age-sex methodology. Further, research is required that can be used to distinguish format segments among the audience and to illustrate the homogeneity of an audience segment. Within this set of research needs, the concept of segmentation, as commonly used in marketing is examined as a prepatory step toward improved audience analysis.

It is to this building block of audience research that this dissertation is directed. With an increasing complexity in program types, changing tastes, program capacity, and program availability, simple unidimensional approaches to the problem of audience segmentation may be quite limited. Hence, a procedure that goes beyond the unidimensional approaches currently used to distinguish segements within the audience is desired. In the multichannel programming environment, audience selections are drawn from a multitude of sources. Current unidimensional demographic procedures have been illustrated as insufficient to discriminate the subtle aspects of format preferences within the competitive radio market. Thus, more refined procedures need to be investigated. One set of techniques termed "geometric techniques" has been widely illustrated in communication and marketing science to be applicable for market segmentation studies in which the object of the analysis is an intangible, as in aesthetic preferences. Geometric

techniques are useful in that they employ a multidimensional, rather than a unidimensional approach, to provide a frame of reference for subsequent analysis. Chapter Three provides a detailed review of multidimensional methods for indicating segmentation and homogeneity of the derived segments. It is the task of this research to examine audience segmentation based on musical format preferences. Chapter Three discusses the methodology, hypotheses, and instrumentation used in these multidimensional analyses.

Summary

This chapter reviewed literature germane to an analysis of audience segmentation by format preferences in the multichannel environment. This covered concepts of the audience, radio programming, format preferences, and the closely allied problem of market segmentation.

The primary findings of this chapter were: (1) the radio audience is not clearly defined and is served by an array of distinct programming services; (2) the audience selects programming in accord with their preferences; (3) radio programming is local, rather than national in scope; and (4) market segmentation procedures are informative for audience segmentation analyses. A strong call for research has been issued by numerous authors to direct attention to the problem of identifying format distinctions and audience segments. This research is directed to an exploratory geometric, or multidimensional, analysis of the radio audience segmentation problem.

CHAPTER III

Methodology

Introduction

The most commonly applied methods of radio audience research encourage audience members to either fill out diaries of listening, or answer the telephone for a coincidental survey, or to have channel selections monitored electronically. These data gathering methods are then used to provide measures of the size and composition of the audience. Both the telephone and diary methods provide data indicative of radio station selections. Other collected audience data sometimes consist of other demographics of marital status and socio-economic status indicators. Additionally, consumer lifestyle indicators are occasionally gathered, but these are used more for target marketing purposes and are traditionally measured using unidimensional scales. With electronic monitoring, it is not possible to make inferences about any characteristics of the audiences' preferences.

In syndicated radio audience accounting eleven age-sex categories are reported. Most radio markets have more than eleven competing radio signals. Each signal has its own possibly distinct audience. The question is in how are the audiences for competing radio stations to be distinguished from each other within a traditional age-sex category. As described in the last chapter, these distinctions are insufficient for theory development and need to be extended for the academic user community. While at present these developments are likely far to expensive for national application for syndicated research, the

precision offered provides academic researchers with a mechanism for further articulating audience research methods and an understanding of the radio audience.

The review summary in Chapter Two noted that radio programming can be identified according to formats, and the the audience has diverse programming format preferences. However, communication research into the nature of the radio audience has been inhibited due to a lack of theoretically developed audience constructs and an absence of refined methods for studying the radio audience. Traditional radio audience research techniques are uninformative in regard to audience tastes aside from providing a simple accounting of the size of the audience of stations in the broadcast market. Methods are needed that can segment the radio audience according to their radio programming preferences in such a manner which would provide for theoretical development and predictive utility of the audience selections among competing radio formats. Current methods are insufficient to provide the needed data. Market segmentation is an established practice for subdividing the aggregate consumer market into segments, or subgroups. Chapter Three discussed methodological aspects of market segmentation. Geometric methods are the focus due to their uniquely demonstrated ability to provide a numerical frame of reference for analysis, and their demonstrated utility in market segmentation studies. Market segmentation applications are reviewed as they apply to segmenting the radio audience according to their format preferences. The utility of multidimensional geometric analysis are discussed. Research hypothesis

are presented. The analysis plan is described.

Segmentation Methods

Audience segmentation is the term which describes the process of categorizing mass media audiences into distinguishable sub-audiences, based upon detectable characteristics their programming preferences. Market segmentation is a process of identifying segments, or subgroups, within the consumer market. The ideal audience sought by advertisers and marketers is a market of consumer prospects. The current unidimensional accounting methods of radio audience measurement do not identify the radio audience members with sufficient precision to provide any theoretical richness for predicting the audience distribution across format. This problem is further complicated, as indicated earlier, by marketing procedures which are based on seeking national broadcast audiences while radio can have specific market to market characteristics. Marketing communication has long been faced with the difficulties of reaching audiences who are assumed to be specific commercial targets with promotional messages. Marketing communication has developed segmentation methodologies which can be used to segment the audience. Common classes of segmentation variables are demographics (e.g., age and sex), attitudinal (e.g., likes and dislikes), product usage (e.g., brand preferences); and brand loyalty. Each of these is a unidimensional measure.

Analytical Methods marketers often use in segmentation research are quantitative. Others have illustrated the applicability of a wide range of quantitative tools to market segmentation. Some of these approaches use consumer preferences for products and brands as an explanatory component. In advertising and marketing communication research the operational representation of consumer preferences is necessary for empirical analyses to be performed. The "representation problem" as. it is termed, recognizes that the manner in which a phenomenon is represented circumscribes and limits subsequent analyses.

Frank and Rao (1971) illustrate regression, factor analysis, and discriminant techniques for marketing problems. Similarly, Sheth (1970) suggested wide ranging applications of factor analyses, profile and cluster analyses, cannonical analyses, discriminant analyses, and multidimensional scaling. Each of these methods has received application in segementation studies: primarily in discriminant analyses (Day, 1970; Pressemier, Burger & Tigert, 1967), and factor analysis (Ehrenberg, 1971; Moschi, 1976).

These techniques can be subdivided into two general sections: algebraic techniques (or measures of dependence) such as regression, and geometric techniques (or measures of interdependence) of which factor analyses and multidimensional scaling are examples. Segmentation research, with perhaps the exception of discriminant analysis, seems to have favored the geometric mapping techniques.

Perceptual Mapping has been widely applied over the past ten years. It has been shown to be widely useful in marketing for discriminating perceptual attributes and interrelationships for retail environments and among competing brands. In this sense, perceptual mapping is used to investigate aesthetic preferences, or distinctions among contrasted items which are interrelated or not simply describable in simple common language. (The old classic "What is art?" serves as an example.) Perceptual mapping is only a recent development due to the mathematical complexity of its analytical procedures. Perceptual mapping is useful in the present study in that it allows the representation of the audience's preferences among competing music forms and radio programming materials. These are aesthetic and subjective judgements, or matters of taste. The radio audience segments are seen as having preferences for one particular format or another. Hence, perceptual mapping can be used to identify attributes of radio programming and the interrelationships among them. The computational demands of perceptual mapping are substantial and required intricate and custom software to be conceived, designed and compiled. Over the past decade a variety of perceptual mapping software packages have been developed. With the development of advanced electronic computing hardware and software engineering, communication and marketing scientists have increasing access to algorithmic and operational techniques that now make it realistically possible for geometric analyses on large data sets to be performed (Coombs, 1976; Daniel & Wood, 1972; Tukey, 1978; McNeil, 1977; Woelfel, 1980).

Perceptual mapping has an array of applications. Preferences are usually viewed as contingent upon complex interrelationships among sets of variables (Tversky, 1981). Geometric methods are especially useful for representing complex interrelationships among variables (Borg, 1981; Shepard, 1980; Carroll & Arabie, 1980; Kruskal & Wish, 1977; Shepard, Nerlove, & Romney, 1972).

Blattenberg and Sen (1974) examined market segmentation using models of multidimensional purchasing behavior. They note

> A perceptual map consists of the consumer's perceived location of several brands on an n-dimensional product-attribute space. These locations can be used in conjunction with the consumer's preference ranking of the brands to infer the location of his "ideal" point in the same space. The consumer's "ideal" point is that position on the map which represents his most-preferred level of each product attribute.

Perceptual mapping is useful for selecting attributes of new products entering the market, in particular for product features and pricing (Hauser & Simmie, 1981). Gensch (1978) found that perceptual mapping was useful for providing the researcher with empirical insights for segmenting a market according to different images of products. He also noted that promotion can create a gap between actual and perceived images (p. 393). This finding was revealed through the use of geometric techniques. Thus, geometric analyses can monitor promotional campaigns and alert researchers to any unintended side-effects of their message campaigns.

In relating segmentation to perceptual mapping, Johnson commented (1975, P. 14):

> . . . market segmentation analysis refers to an examination of the structure of a market as perceived by consumers, preferably using a geometric space model, and to forecasting the intensity of demand for a potential product positioned anywhere in the space. The purpose of such study is . . .
>
> (1) To learn how brands or products in a class are perceived with respect to stengths, weaknesses, similarities, etc.
>
> (2) To learn about consumers' desires, and how these are satisfied or unsatisfied by the current market.
>
> (3) To integrate these findings strategically, determining the greatest opportunities for new brands or products and how a product or its image should be modified to produce the greatest sales gain.

Geometric Methods are known in communication and marketing research as most useful for "preference" and "image" studies, i.e., studies that make use of the geometric spatial arrangement of points (which represent variables) relative to each other. Also, more advanced geometric methods yield a coordinate reference system as a basis for further numerical analysis.

Geometric analyses have been widely used for mapping (geometrically representing) variables in studies of store images (Sheth, 1970; Woodside, 1973), brand postioning (Assael, 1970), and constructing perceptual spaces for products and services (Gensch, 1978).

Geometric analyses are diffusing into the study of audience research. They have been demonstrated to be useful in research on contemporary radio formats (Williams & LeRoy, 1976) and in examining whether or not consumers' media exposure patterns are unidimensional

(Martin, McNelly, & Izcaray, 1976). These authors found that a multidimensional procedure was superior to a unidimensional approach for understanding exposure patterns. Current industry techniques, most notably the Simmons Market Research Bureau and the American Research Bureau (ARBITRON) consider media exposure patterns and preferences to be unidimensional, and most often categorical. For example, TV exposure is converted for quintile analyses.

In order to emirically segment the radio audience, a method is needed that can represent the complexity of audience preferences and perceptions among the audio offerings. Previous research suggests that geometric methods are appropriate for analysis of preferences and interrelated attributes and for detecting underlying dimensions among the audiences preferences. Geometric analyses offer valuable advantages in quantatitive research. First, geometric analyses require the mathematical construction of a frame of reference, or coordinate system, (or "space" as it is frequently colloquially termed). Second, geometric analyses allow the application of vector analysis which can be used for testing assumptions of linear relationships as well as more complex interrelationships among variables (complex vectors on Minkowski or Riemann spatial manifolds).

Geometric analyses are becoming increasingly adopted. Most notably with current writings on geometric representation of relational data (Borg, 1981; Woelfel & Fink, 1980; Lingoes, Roskam & Borg, 1979) multidimensional geometric analyses are being increasingly systematized. Following from the data classification procedures of Coombs (1976) and

general analytical approaches offered by Van de Geer (1971), Nobel (1969), and Green and Carroll (1976), the various aspects of data collection, data preparation, and computation for geometric analyses are receiving wider recognition and application in the social sciences. This is coupled with improved availability of computer facilities and geometric software which is aiding in the diffusion of geometric modeling throughout univeristy and industry settings (cf. Carroll & Arabie, 1980).

A geometric representation of relational data allows data to be subject to geometric analyses based on stringent vector principles (Hay, 1953). In geometric analyses, variables are represented as points in n-dimensional space in reference to the axes of a derived coordinate system. Each axis is mathematically termed a dimension. Communication methodologies sometimes name a dimension as a "factor." (The term dimension is used throughout this manuscript.) The derived dimensions, taken as a set, comprise the mathematical frame of reference for further geometric analyses.

The primary forms of geometric analyses currently used are factor analyses and multidimensional scaling. Factor analysis is distinguished in that ordinal data are usually standardized, and then the presumed euclidean structure of their correlation matrix is extracted. Metric Multidimensional Scaling, in contrast, does not standardize ratio-level paired comparison data and the double-centered scalar products matrix is factored (Torgerson, 1958; Gillham & Woelfel, 1977). With this latter process, it is not necessary to limit the analysis to the

physical-reality constraints of euclidean relationships; rather a more general Riemann, Minkowski, or Caley-Klein geometry may be used (Drosler, 1981; Borg, 1981; Woelfel, Barnett, & Dinkelacker, 1978).

One method of geometric analysis that has been used in market segmentation and applied to media research is factor analysis. While suffering from analytical deficiencies as described below, factor analyses do provide a geometric representation of preferences in order that spatial models can be investigated. Factor analyses have applications to audience research because they allow the reduction of the complexities of radio audience preferences into manageable geometric coordinate systems of a limited number of dimensions. has been widely applied and has been useful in market segmentation. Ehrenberg (1971) demonstrated the arraying of television programs by the geometric technique of factor analysis. Hawkins' (1972) factor-analytic examination of the dimensional structure of children's perceptions of television reality noted the geometric utility for segmenting the subjects into four fairly distinct groupings. Gutman (1978) found six categories of viewers with factor analyses. Similarly, factor analyses has been used in a wide array of other communication research including detecting relationships between market shares and broadcast station characteristics (White, 1977); the use of television by children and adolescents (Rubin, 1978); measuring audience perceptions of violent television content (Howitt & Cumberbatch, 1974); measuring consumer tastes in popular music (Shulman, 1979); and also indicating media program types (Gordon & DeLeo, 1976; Kirsch & Banks, 1962). Factor

analysis, however, imposes severe analytical constraints on the data structure which can limit its utility or render its interpretation erroneous (Lee & Comrey, 1971; Woelfel, 1980; Harmon, 1976). Notably, these limitations arise from a priori assumptions concerning the spatial geometry (i.e., euclidean) and ordinal data standardization prior to factoring. This reduces the distinct shape of a spatial manifold into a n-dimensional uniform hypersphere, in which all spanning vectors are of equivalent length (Isaacson & Isaacson, 1972; Nobel, 1969). The impact of this procedure is that each spanning dimension is normalized to a value of unity. In geometry, two variables are fundamental -- angle and length. When data are standardized all the spanning vectors are normalized to unity. Therefore, they are all of identical length, thus length no longer discriminates among them. Further analyses are inhibited because only the variable of angle remains.[1]

In factor analyses, the analyst a priori assumes the manifold characteristics of the space (e.g., euclidean) and a priori accepts dimensional interpretation (e.g., factors with eigenvalues less than 1.0 are to be discarded). To a large degree these decisions are an artifact of unnecessary scaling or computation limitations (Droesler, 1981; Woelfel, 1980). Such limitations can arise from ordinal scaling, data standardization, and the lack of computer software capable of factoring complex (in the mathematical sense) data matrices. Thus, factor

[1] In geometric terms, a correlation between two variables is isomorphic to the cosine of the angle between the two vectors that represent the variables measurements.

analysis is of limited utility under even the most ideal research conditions. As this discussion suggests, factor analyses are of limited utility due to the methodological difficulties and the necessity of making explicit assumptions about the geometric nature of the space which may be false. Hence, factor analyses are not desireable for the present study. Instead, multidimensional scaling provides an advantage over factor analyses as described next.

Multidimensional Geometric Representations of data have been shown to be widely useful in varied applications. Technically, multidimensional denotes at least two dimensions, frequently more. Multidimensional Scaling (MDS) is a technique for the geometric representation of data. Multidimensional scaling is "concerned with the detection and definition of patterns in bodies of data " (Coxon & Jones, 1980, p. 31). Shepard (1980), a pioneer in MDS, provides a general introduction into several useful geometric methods, including MDS. MDS, in particular, has been applied to extremely diverse areas as noted by Carroll and Arabie (1980) in an insightful review which cites over 330 published MDS manuscripts. None of these examined radio audience segmentation by format preferences. MDS has been repeatedly demonstrated as a valuable analytic aid.

Torgerson, another pioneer in multidimensional scaling (1952), expanded the geometric work of Young and Householder (1938). He extended their discussion of a set of points in terms of their mutual distances, to the metric relationships of multidimensional scaling, and presented a thorough theoretical treatment and multidimensional analyses

of _metric_ scaling.

Gonzalez (1975) in an extensive application of multidimensional scaling to market segmentation by consumer perceptions, commented

> . . . it is our belief that, in order to improve the communication necessary to modify consumer perceptions, advertising media research in the various segments should be conducted. This would reduce the risk of ineffective and inefficient advertising campaigns.

Multidimensional scaling is useful for gaining insight in regard to those attributes which buyers use in discriminating among competing brands (Johnson, 1975). Multidimensional scaling has also been used to discriminate aesthetic preferences among musical types in the study of jazz recordings (Huber & Holbrook, 1980). In this study, multidimensional scaling was used to distinguish aspects of structure, complexity, and familiarity of jazz recordings. Multidimensional scaling is useful in these contexts due to its ability to geometrically represent interrelationships among numerous variables which may be contributing components to aesthetic preferences and tastes (c.f., Romney, Shepard, & Nerlove, 1972; Kruskal & Wish, 1978; Shepard, 1980; Borg, 1981). With multidimensional scaling, complex interrelationships of mutual interaction among variables can be detected and represented numerically. These analyses provide the basis for descriptive procedures and exploratory analyses for measurement model refinement (Gillham & Woelfel, 1977). A geometric approach also affords the opportunity for a mathematical representation of similarity and homogeneity among data points, as well as for the representation of change as displacements of points in multidimensional space. This is

particularly important when the audience segmentation variables are complex, abstract, and interrelated. Under these circumstances, previous research suggests the use of multdimensional methods in that this approach affords the opportunity to represent measurements in terms of a general coordinate system, in which numerical relationships can be tested.

Gonzales (1975, P. 30) commented on the application of multidimensional scaling market segmentation by consumer perceptions. He noted:

> We use a multidimensional approach to consumer attribute perception. In our view, several variables interact simultaneously, but hetereogeneously, on consumer behavior. . . . It attempts to describe how the consumer behaves and what he wants from a product, rather than assume normative criteria about these.
>
> . . . The approach chosen for this study has been used in developed countries to evaluate consumer perceptions in such different marketing situations as perceived. attributes of business journals, graduate programs, political candidates, the advertising media, and consumer products.

In multidimensional scaling, measurements are made and then a geometric representation is derived from the collected set of measurements. The resulting structure allows interpretation of overall structural relationships among the points (which represent scaled items) in geometric space. This provides a coordinate system in which the overall perceptions of the survey respondents are portrayed as points in space, each designated by a set of coordinates. However, for market segmentation, further distinctions are desired for analyses than the general "space" can provide. For these purposes, methods of breaking

the space down into subspaces are used. This process of subdividing, or segmenting, the perceptual map provides for analyses which are suggestive of specific and particular relationships among subsets of the data (Tukey, 1980; Green & Carmone, 1972; Dinkelacker, 1981). Subspaces, in this case, are associated with the "breakdown" or "sub-group" criteria mentioned in the earlier discussion of market segmentation.

Green and Carmone (1972, P. 12) suggest

Conceptually, then, a market segment might be viewed as a subspace in which all members:

1. Perceive the stimuli simlarly, and

2. Possess the "same" ideal point position and dimension saliences.

Green and Tull(1974, P. 15) have said:

Partitioning the superspace of ideal points and stimuli into reasonably homogeneous subspaces -- and identifying the characteristics of consumers who exhibit commonality of perception and preference --- appears to be in the spirit of market segmentation strategy.

The practice of deriving subspaces from the data in order to detect market segments is useful. However, multidimensional scaling suffers from a dual meaning in regards to data interpretation. This is whether the data are conceptualized as representing individualistic or aggregate phenomena. This is an important distinction, in that the entire process of analyses is dependent upon which of the two approaches is used. The individual methods of multidimensional scaling are frequently termed "non-metric" methods. These methods have as their goal the

identification of dimensional structures in the data of individuals, frequently on a person-by-person basis. Aggregate approaches are directed to an analysis of aggregates of people and derived dimensional structures based on the data from the entire aggregate (Woelfel & Danes, 1980; Torgerson, 1958). The present audience analysis is concerned with an _aggregate_ conception of the audience; thus, a closer description of metric multidimensional scaling will be presented.

These two primary varieties of MDS have gained acceptance. They differ in the interpretation of the dimensionality of the solutions. Non-metric methods use standardized data (as in factor analysis) and use a goodness-of-fit criterion to determine the dimensionality of a space. As illustrated by Woelfel and Fink (1980) the goodness-of-fit used by non-metric MDS is an artifact of ordinal scaling and an attempt to fit a multidimensional solution into a frequently presumed, yet inaccurate geometric manifold (e.g., euclidean).

Both factor analysis and non-metric multidimensional scaling generate their coordinate systems by what has been termed "blind" transformations (Woelfel & Fink, 1980). A blind transformation is one in which the original data structure _cannot_ be be regenerated from the coordinate solution. In other words, factor analysis and non-metric multidimensional scaling generate data structures that are not reversible. That is, the transformation is a "fitting" function, on an individual by individual case basis which both modifies the original data structure but yet provides no information about the modifications and adjustments that have been made to the data. This is a severe

limitation.

Metric Multidimensional Scaling. MMDS utilizes as many explanatory dimensions as can be extracted from the data by mathematical factoring procedures. Rather than discard dimensions with small eigenvalues all dimensions in the geometric solution are retained until subsequent analyses indicates which ones, if any, are of numerical utility, and all roots, including those in imaginary space, are extracted from the initial data matrix (Barnett & Woelfel, 1978; Woelfel & Fink, 1980).[2] In a study of bilingualism, Barnett and Woelfel (1978) found no language dimension emerged to differentiate english and french media descriptors. Using dimensions that would have been discarded by traditional analyses, these authors found that a language attribute vector that discriminated

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[2] Imaginary, in this sense, denotes the set of imaginary numbers, of which the square root of negative unity is a familiar example. The notable aspect of these numbers is that when squared, the resultant is a negative number. It is this extension of the real number system into the complex number system which allows the geometric mapping of what are termed "triangular inequalities." These inequalities frequently occur with paired comparision measurement schemes, commonly used in multidimensional scaling (Coombs, 1976; Gillham & Woelfel, 1977). For example, an individual may prefer Brand A over Brand B, Brand B over Brand C, and yet Brand C over Brand A. For measured differences between brands or products this is witnessed when the difference between brands "A" and "B" is greater than the difference between "B" and "C" which is greater than the difference between "C" and "A" (A-B > B-C > C-A). Analytical procedures which are incapable of extracting the imaginary roots of a data matix make the *a priori* assumption that this triangular inequality does (and must) not occur. Substantial research data demonstrates the frequent occurence of triangular inequalities (Woelfel & Fink, 1981; Roskam, Lingoes & Borg, 1979). Thus, an algorithm is desired which can extract the imaginary roots of a data matrix. Some non-euclidean algorithms, particularly ones which map Riemann, Minkowski, or Caley-Klein spatial manifolds, have this property.

the language of the descriptors was in the space. This vector spanned dimensions that would have been considered simply as "error" in traditional analyses. Thus, the metric approach was able to make discriminations in the attribute structure of their sample that remained undetected by traditional means.

The primary advantage of the metric multidimensional techniques is that the calculation of the coordinate reference frame is a totally reversible transformation. This point can not be stressed too stongly. This means that with MMDS, the starting configuration of mutual distances can <u>always</u> be converted into an n-dimensional Riemann spatial manifold, and that this derived coordinate system can <u>always</u> regenerate the starting configuration of the original data. Thus, no information is lost in the transformation to calculate the coordinate system. Thus, the metric multidimensional scaling techniques avoid "blind" transformations (such as factor analysis) which produces frames of reference that are incapable of regenerating the starting data.

MMDS survey data are particular in that they are generated by a numerical paired- comparison process in which a reference standard (e.g., 100) is used as a ruler for scaling. These numerical scales are unbounded at the upper end and the lower end is fixed at zero (Thurstone, 1927; Torgerson, 1958; Hamblin, 1974; Gillham & Woelfel, 1977). Here is an example of this comparative scale:

If the difference between ROCK and JAZZ is 100; What is the difference between JIMI HENDRIX and YARDBIRD PARKER?

MMDS analyses frequently use a more general Riemann, rather than Euclidean, multidimensional space (Woelfel et al., 1978). Thus, MMDS implies a geometric technique which is applicable for aggregate analysis and distinguished by the manner in which data are encoded and analyzed for aggregates.

MMDS has been found to be useful in communication research as a general research method (Woelfel & Fink, 1980) with widely divergent areas of application, such a political communication research (Serota, Cody, Barnett, & Taylor, 1977) and individual information processing (Stoyanoff, 1981). Gillham & Woelfel (1977) provide a general introduction to metric multidimensional scaling with an example applied to perceptions of professors in a sociology department. Craig (1977) applied MMDS to test the effectiveness of a message proclaiming similarity among distinct nations. McPhail and Barnett (1977) used this technique in a study of Canadian citizens perceptions of self and national identity as a function of US media exposure. Woelfel, Cody, Gillham, and Holmes (1980) used MMDS in a study of source credibility and its effect on message effectiveness. Barnett (1980) presents a bibliography of MMDS research. This literature indicates that the role of MMDS in communication research is growing and under development.

MMDS has been applied to numerous research situations, and a comprehensive review is presented in Woelfel (1980) and Woelfel and Fink (1980). In regards to the present research, Gordon (1976) demonstrated that MMDS was useful to identify distinctions among television program types. Gordon noted that under numerical expansion and contraction of scaling reference standards, the relative positions of program types were stable in reference to each other. This indicates that descriptors of program types (e.g., Crime Shows, Comedy Shows) can be reliably used as concepts for metric multidimensional scaling. Westwood (1978) applied MMDS to a marketing communication study which was designed to develop a message campaign directed to increasing attendance at live fine arts performances at a large midwestern university. In this study, message strategies promoting attendance at fine arts performances were designed based on the relative proximity of data points which represent program types and student activities for distinct subgroups, or market segments, of students. These two studies provide a background for further audience research. The Gordon study uses MMDS for distinguising format types, and the Westwood study uses MMDS to identify people likely to be prospective attendees for fine arts performances -- a program selection based on tastes.

The validation of the geometric approach is here investigated by a comparison of the multidimensional segmentation procedure to the known industry procedures of Simmons and TGI. Serota (1974) presents a comprehensive discussion of the validation of multidimensional geometric procedures in regard to their usage for scaling of the perceptions of

aggregates. Danes and Woelfel (1976) describe the ability of metric multidimensional scaling to be equally precise as standard ordinal scaling procedures for mass communication research. Gillham and Woelfel (1977) discuss the validity of metric multidimensional scaling in terms of their equivalence to traditional procedures and find that the multidimensional methods are both more accurate and more precise in predicting change over time than unidimensional measures. The suggested comparisons are discussed in Chapter Four. The general validation procedures for multidimensional scaling have been examined in depth by several authors. Please see Shepard, Nerlove, and Romney (1972), Kruskal and Wish (1977), Green and Rao (1972), Shepard (1980), and Woelfel (1980). Each of these authors discusses the ability of geometric mapping as a predictive mechanism for observable behaviors. These reviews cover applications is psychology, political science, communication, and sociology.

This review suggests that segmentation according to preferences is appropriately performed by use of a geometric method because geometric models are useful for mapping the interrelationships and underlying structures of preference data. Of the geometric methods factor analyses and multidimensional scaling were reviewed and metric multidimensional scaling was selected due to the fact that the factoring procedures use a general Riemann rather than limited euclidean manifold, and that this transformation is totally reversible. These findings suggest that MMDS is an applicable segmentation method for the radio audience according to format preferences. This suggestion is to be tested.

Research Hypotheses

Several recent authors (Mosteller & Tukey, 1978; Coxon & Jones, 1980; McNeil, 1977; Leihardt & Wasserman, 1979) stress the distinction between confirmatory analyses and exploratory analyses. Confirmatory analyses seek to identify statistical distinctions and provide hypotheses tests of well-defined relationships. Exploratory analysis, in contrast, seeks to identify underlying patterns in data as well as address research questions for which statistical tests are premature, either as a result of nascent theoretical development or a current absence of appropriate statistical testing techniques and computer software. The confirmatory hypotheses and exploratory research questions addressed by the present research are described below.

This research is directed to distinguishing audience segments according to format preferences. Two classes of hypotheses are presented in this dissertation. The first set investigates the internal consistency of the MMDS segmentation methods. The second set examines the utility of the multidimensional segments in comparison with traditional unidimensional methods for audience segmentation. Six hypotheses are tested in this dissertation. These are listed then discussed individually. The first hypotheses tests the dimensionality of the audience's audio preferences. The second hypotheses tests the multidimensional discriminations among format preferences. Hypotheses I and II are internal consistency tests. The third hypothesis tests the predictability of radio listening levels by a spatial method. The

fourth hyothesis tests the applicability of a geometric method for predicting away-from-home radio listening as compared with traditional measures. The fifth hypothesis tests the predictability of audience radio station selections according to multidimensional versus traditional unidimensional methods. The sixth hypothesis tests tests the predicatabilily of product usage according to multidimensional versus traditional unidimensional methods. In each of the discussions below the phrase "traditional methods" referes to the brand preference and brand loyalty measures used by Simmon Market Research Bureau and the Target Group Index and the traditional audience measurements refer to the eleven age-sex categories described in Chapter II. For format preferences, traditional measures are taken to indicate the nominal indication of a "favorite" format preference from a provided list. In order to fully test a multidimensional procedure for investigating the radio audience, a series of conditions about the measurement of the audience preferences should be met. The first two hypotheses directly address two of these conditions. First, as is customary in multidimensional research, the audience data are tested to assess whether or not in empirical fact the data are multidimensional. Secondly, for a multidimensional technique to be useful, it must provide a discrimination among the competing formats. For the second hypothesis this is tested by the relative spatial location of the self concept to the distinct format types.

Hypothesis I. The primary reason for the current research is to assess the utility of multidimensional geometric methods for radio audience segmentation. For this to be accomplished it is necessary to initially determine whether or not the preference space of radio formats is in fact multidimensional. The first hypothesis tests the dimensionality of the radio format perceptions of this sample of radio listeners. Thus, the first hypothesis is

> H-I: The set of stimuli that define the domain of radio
> ＼ formats is multidimensional.

Contrary evidence to this hypothesis suggests that the format perceptions of the sample are unidimensional and that geometric techniques are unnecessary.

Hypothesis II. The second hypothesis tests the ability of a spatial method for discriminating format preferences within the audience. In order to segment the radio audience among competing stations it is necessary to discriminate among the audience format preferences. The underlying dimensionality of the format preferences indicates the complexity of these perceptions to the audience. In marketing, the self-concept is used to refer to the self in comparison to other concepts as an indicator of the relationships between the self for the other items. Items which are calculated as closer to the self are judged to be more closely associated with the self (Green & Rao, 1972). Thus, the self should only be equidistant from the radio format descriptors if no relative association is present, or detectable. This hypothesis tests this ability.

H-II: The self-concept descriptor is <u>not</u> equidistant from the format descriptors.

Contrary evidence to this hypothesis suggests that the preferences of these listeners cannot be detected by use a geometric multidimensional method.

Conventionally, in perceptual mapping, the location of the self concept relative to another concept is taken as an indicator of association between the two. This has been demonstrated for products, brand preferences, and political candidates among many other items. While some researchers clearly claim that the degree of closeness may not indicate a favorable relationship (e.g., someone who frequents the dentist may consider the self to be close to the dentist but not find the experience preferable or enjoyable). Yet many still directly take the relative location of the self concept as an indicator of rates of behavior. For the present study, this relationship is explicitly tested in regard to the utility of the location of the self concept to a radio concept as a predictor of radio exposure. In this manner, the common assumptions about the location of the self can be tested, rather than just assumed. It is desireable that a segmentation method be informative as to rates of radio exposure in the audience. Two hypotheses were used to test this. Hypothesis III tests the predictability of radio listening by the spatial method. Hypothesis IV compares the car radio listening audience segments derived from the traditional indicator and the spatial indicator to contrast these segmentation methods in terms of their utility for indicating the car

radio audience. of this, and tests the predictability of away-from-home radio listening by means of a geometric method.

Hypothesis III. At present, market segmentation methods do not provide any procedures for predicting radio exposure other than coincidental or next-day recall. With geometric methods the self concept is frequently scaled with other test items. The resulting empirical distance between the self and the other objects has been shown to be linked to rates of behavior (e.g., smoking) and voting decisions (Woelfel & Hernandaz, 1976; Serota, Cody, Barnett & Taylor, 1976). For audience segmentation, radio listening is a known characteristic of the audience. Thus, it is expected that the distance between the self concept and radio would be predictive of the level of radio exposure in this audience. The closer that the self is to radio, the greater is the expected level of radio exposure. This hypothesis tests the ability of the multidimensional measures to detect radio exposure levels of the audience.

> H-III: The level of radio listening is predictable from the geometric distance between the self-concept and the radio concept.

Contrary evidence to this hypothesis suggests that the representation of the self concept in reference to radio is not indicative of radio expsoure levels. Hence, the geometric method would not be informative as to the levels of radio exposure in the audience.

Hypothesis IV. The fourth hypothesis tests the ability of the geometric model to discriminate radio listening between at-home and away-from-home situations. Traditional measures provide no segmentation information in regard to away-from-home listening. Yet radio is highly portable and is a constant companion to many people. A segmentation method is desired which can provide an indication of away-from-home listening. This hypothesis is similar to hypothesis III in that the geometric measure of distance between the self-concept and radio is used to predict the level of away-from-home listening.

> H-IV: A geometric method accounts for a greater percentage of the variance in audience away-from-home listening than traditional unidimensional market segmentation measures.

Contrary evidence to this hypothesis suggests that the geometric method used here is unable to provide an indication of the radio audience's away-from-home listening as part of the segmentation procedure.

Two other aspects are necessary for a segmentation method to be highly useful. First, the method of segmentation should provide a greater indication of radio station selection than traditional unidimensional measures. Second, the segmentation method should provide a greater indicator of selected product usage patterns in the audience. These aspects are tested by hypothesis V and VI. Hypothesis V tests the predictability of radio station selections by the multidimensional and by the unidimensional measurements. Hypothesis VI tests the predictability of musical record album purchases by the multidimensional and the traditional measures.

Hypothesis V. As indicated earlier, a fundamental problem in current audience segmentation research is the inability of present unidimensional methods to distinguish the audience and station selections of the radio audience among competing radio stations in the market. A segmentation method for radio audiences needs to be able to predict radio station selections in order to determine the audience preferences among stations.

> H-V: A geometric method accounts for a greater share of the variance in radio station selections than traditional unidimensional measures.

Contrary evidence to this hypothesis suggests that the presented multidimensional method is unable to predict radio station selections any better than traditional measures. This would indicate that the utility of multidimensisonal segmentation is limited and uninformative as to the audience stations selections within a particular format.

Hypothesis VI. This hypothesis is designed to assess market segementation and product usage patterns among audience members by means of the geometric method. Record albums are the selected product and purchases are predicted by the multidimensional method and traditional brand preference and brand loyalty measures. This hypothesis tests the predictability of product selections by a multidimensional procedure. Hypothesis VI follows.

> H-VI: The geometric method accounts for a greater share of the variance in record album purchases than traditional segmentation measures.

Contrary evidence to this hypothesis suggests that the geometric method is no better than traditional market segmentation methods in accounting for product usage patterns.

These six research hypotheses are tested in order to investigate the utility of a geometric method of radio audience segmentation according to their format preferences. The homogeneity of each audience segment is investigated by use of exploratory MMDS indicators. This is discussed in the next section.

Exploratory Analysis. An additional exploratory analysis is presented in this study. Geometric methods are useful in that they provide a measure of the interrelationships among all the variables. Others have shown that the sum of the roots (i.e., the trace) of a geometric configuration is indicative of the degree of homophily, or homogeneity, among the scaled items as perceived by the sample. In particular, Barnett (1980) discussed the relative homogeneity of groups at different stages in the innovation adoption process. He found that the trace of a geometric space provided an acceptable measure of homogeneity of the sample's perceptions.

The trace of a space is the sum of the eigenvalues across all dimensions and is suggestive of the overall hyper-volume of the n-dimensional space. Subspaces in which respondents perceptions are more different among themselves are indicated by a larger numerical trace than one from a subspace in which the repondents' have similar perceptions among themselves (Barnett, 1980; Woelfel et al., 1978). In

these analyses, a small trace is indicative of a relative homogeneous set of perceptions. If, for the purposes of audience segmentation, relative homogeneous groups are sought, the trace provides an exploratory indicator of the homogeneity among the groups format and program preference perceptions.

These exploratory analyses investigate the relative degree of homogeneity among the geometric audience segments. As discussed in Chapter Two, a criteria for segmentation is that the segment be more homogeneous than the overall audience. Thus, this exploratory analysis examines the homogeneity of the geometric audience by segments using the trace of the space as an indicator. These segments include those delineated in the hypotheses section.

Survey

A survey procedure was selected to field test these hypotheses. The instrumentation is described in the next section. The survey instrument is to be administered to a target age-sex audience category of young adults (18-34). Respondents are requested to complete the survey instrument on their own time and at their own pace.

The goal of this study is to examine a procedure for radio audience analysis within the conventionally used age-sex categories in radio audience accounting. For this study a specific age category was selected for explicit scrutiny. The 18-34 age bracket is valuable for audience research in that young adults are a valuable audience for advertisers, that they usually have several stations competing for their attention in the radio market. It is necessary to limit the this exploratory study to a manageable size. Thus a single broad age category was selected.

The target sample size for this study is 100 respondents. This sample size allows for simple two-by-two classification schemes within this age category while providing approximately 25 respondents per cell. To assess the audience distribution across three directly competing stations, approximate cell sizes of 33 respondents each are provided. These were chosen because commonly used student-t and chi-square tables, as well as correlation coefficient and population variance estimation tables have their first major break at n=30. This 30 is in the middle of the 25-33 range indicated above. These respondents are to be surveyed about their radio listening patterns at home and away, musical

format preferences, favorite radio stations, and their usage of a selected product -- record albums. The location of the survey is to be in the Lansing, Michigan radio market. This sample is more fully described in the next chapter.

Instrumentation. The instrument was designed to acquire specific data from the survey respondents. The data sought included standard demographics of age, sex, marital status, income, race, education, and type of residence. Rank orderings are asked about format preferences, radio station preferences, and album purchases. Radio usage questions are asked about the amount of time, the time of the day, and the radio stations listened to, both at home and away from home. Another list of categorical questions are asked in regard to pervious work experience in radio, musical training, drinking and smoking behaviors. These unidimensional marketing variables are used to assess the the relative degree of using traditional marketing segmentation variables to predict audience segments across program formats. The instrument also contains a set of multidimensional questions about radio preferences and attributes of radio programming and radio stations. Format descriptors, radio stations, and music descriptors are used as items in paired-comparison questions for geometric analyses.

The questions were then combined into the survey instrument. A pretest study was executed in preparation for the present research. The pretest was designed to (1) gather word-items from a target of audience members in regards to their musical preferences to define the domain of meaning of these concepts from a sample of radio listeners; (2) suggest

word-items and the scaling reference standard for the present research; (3) refine the MMDS instructions; and, (4) review the instrument with a random sample of radio listeners. This pretest research formed the basis for the instrumentation of the present research.

The instrument was developed by both intercepting people in East Lansing, Michigan on the streets or on campus, and by randomly calling people on the telephone and asking them top of mind awareness questions. This was used to gather word-items to define the domain of music for these people. They were asked the question, "Do you listen to the radio?" If they answered "yes" they were interviewed with the question "What type of music do you like on the radio?" The most common responses were rock, easy-listening, classical, country, top-40, jazz, and progressive. In a similar set of questions about musical preferences, the most common responses were: Rock, Jazz, Country-Western, Progressive, Blues, Folk, Easy-listening, and Classical. The musical formats selected from these are rock, jazz, top-40, country-western, and easy-listening.

For the multidimensional analyses, the method of complete paired comparisons (Torgerson, 1958) were used. In addition to the musical format descriptors, four more concepts were included as descriptors, plus the self-concepts "myself" and "my radio listening." Respondents were asked the question: "How would you describe music that you listen to?" The dominant responses to this question were "relaxing" and "exciting." Additionally, in responding to descriptions of program types and the media, these respondents used the words "entertaining" and

"informative." These four media descriptors were included.

Following the recommendations of Woelfel (1980) a criterion pair of word-items were selected from the pretest concepts to serve as the reference measurement standard. The difference between these concepts was set at 100 units. This was to provide respondents with a scale with which numerical discriminations both greater and less than the criterion pair can be easily made (Dinkelacker, 1979). The criterion pair selected for this research is as follows.

If the difference between RELAXING and EXCITING is 100,
What is the difference between [Concept A] and [Concept B]?

This instrument was then combined with the refined instructions and administered to a sample of radio listeners. The analyses and results of this survey, as well as the findings and test of hypotheses are presented in Chapter Four.

Summary

This chapter reviewed market segmentation methodology and focused on perceptual mapping. Perceptual mapping was described to be a geometric technique. Geometric mapping was presented as useful in marketing segmentation studies were preferences and images are segmentation criteria. Two geometric techniques were examined. These were factor analysis and multidimensional scaling. A review of multidimensional scaling illustrated its widespread use in market segmentation. Within the multidimensional methods metric multidimensional scaling (MMDS) was selected due to the fact that the calculated coordinate system can regenerate the starting data martix, within computational error. A second reason for metric methods is that the factoring procedures used by MMDS yield a solution in Riemann, rather than more limited Euclidean space. Utility and validity issues of multidimensional scaling were reviewed.

Six research hypotheses were presented to be tested. These hypotheses were designed to test the internal consistency of metric multidimensional measurements, to test the ability of the geometric method for predicting radio listening, and to test the ability of the multidimensional methods to predict radio station selections and album purchases when compared with traditional market segmentation procedures.

The survey plan was described which included a discussion of the target sample, the site of the study, and the method of administration. The instrumentation of the present study was reported along with the pretesting done to develop the survey instrument.

Chapter IV

Analyses and Discussion

The purpose of this dissertation is to investigate audience segments by a geometric analysis of an audience's musical radio format preferences. To do this, a series of hypotheses were designed to assess the utility of MMDS paired-comparison measurements for discriminating among formats descriptors. For multidimensional research to proceed a series of tacit assumptions and initial conditions about the input data need to be investigated. Metric multidimensional scaling uses input data which are generated according to a geometric distance model. While MMDS has been enjoying increasingly widespread application, initial conditions of the data that it utilizes have not benefitted from a similar focus of study. The purpose of these explicit analyses are twofold. First, to provide an investigation into the utility of MMDS data for discriminating among radio formats and to investigate whether or not these geometric distance data can serve to relate MMDS variables to other research variables not generated according to the geometric distance method of complete paired comparisons. Secondly, the format segments generated by the MMDS measures are then compared with format segments generated to a traditional rank ordering of respondent's format preferences. A series of hypotheses are tested to examine this. Exploratory spatial analyses were performed subsequent to the hypotheses tests so as to examine whether or not the measurement scheme of paired comparison multidimensional methods, in particular those which map

general manifolds, are appropriate to indicate distinctions among audience segments.

Research Management. An instrument was constructed to distinguish format preferences using industry standard ordinal Likert scale items and MMDS ratio paired comparison measurement procedures. Industry standard question-types (Simmon's Market Research Bureau) were used to indicate product usage for record albums. The instrument included questions for the rank ordering of format preferences, demographic indicators, and a series of dichotomous lifestyle questions. Additional scale items were appended to the end of the survey instrument for use in other analyses. This instrument is presented in Appendix A. Specific items of the questionnaire are presented throughout the analyses and discussion at the places the scales were used.

Survey Administration. Respondents for this study were attracted to participation by an offer of credit points in a large televised undergraduate advertising course at Michigan State University in East Lansing, Michigan during the last week of April 1982. The students were informed of an "opportunity" to complete survey questionnaires for the present study, and requested to participate. A one-week deadline for completion was allowed. The instruments were to be returned no later than the following Friday at 5:00 PM. A total of 110 instruments were returned by this deadline.

Data Processing. After the survey instruments were collected each was assigned an ordinal ID number. All questionnaires were then hand coded for format preferences and radio station listening. The data from the questionnaires were then entered via keyboard to disk according to a data structure that matched the ordering of the questions on the instruments in order to facilitiate and simplify data entry into a computer. Data input was performed with an interactive BASIC program which accepted valid codes and wrote the questionnaire data file. The resulting data file was then preprocessed with SPSS {tm}. Unintelligible codes and wild scores were flagged as likely errors and confirmed or modified in conjunction with the original survey instrument. When clean, this base data file was then processed to construct three data structures for easy use in subsequent analyses.

These three files each contained a unique data structure. The Master file contains all data from all respondents, but organized according to data type rather than in the order on the survey instrument. In other words, all the likert items were organized together and all the MMDS items were organized into their subspaces. A second file contained only an identifying header record and then the MMDS responses formatted for Galileo input. The third file contained the radio and album purchase data, format preferences and demographics. The header record for each case in these bases indicates the respondent's primary format preference according to two distinct indicators, a diary for reporting the previous day's radio listening,

and the FM station that they usually listened to while at home. These
three data fields, along with the assigned ID, became the ID field used
in the data base files. An ID coded in this manner improves the ease
with which subsequent runs can be executed in which these variables are
used as criteria for splitting the data into subgroups.

After the data base files were created, previously created computer
programs performed the analyses. The Galileo metric multidimensional
scaling program was used to generate mean differences among the paired
comparison lexical items and to also provide an n-dimensional space of
the radio format items. Summary statistics and multidimensional spatial
indicators were generated with author designed software in FORTRAN IV
and CDC Pascal 6000. Frequencies, crosstabulations, T-Tests, regression
analyses, analyses of variance, and statistical calculations were
executed using SPSS. Chi-square contingency analyses were done with a
calculator.

Sample Profile. This sample of radio users are detailed in Table
4.1, Sample Demographic Profile. Following this table, the sample is
discussed.

Table 4.1
Sample Demographic Profile
Sample Size N = 110

==

Demographic	Categories	and	Counts

Sex:		Year in School	
Males	51%	Freshman	5%
Females	49%	Sophmore	38
		Junior	38
Commute		Senior	16
Car	14%	Other	3
Bus	7		
Race		Median Income	$2004
Caucasian	90%		
Black	2	Buy Records	80%
Latino	3		
Other	5	Listened to Radio	94%
		Yesterday	
Part-time Job	45%	Median minutes of	
		radio yesterday	100 Min
Have worked			
in Radio	8%		

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* Total Instruments = 110.

Demographics. These respondents are 51% male and 49% female. This sample is 90% caucasian, 2% black, 3% latino, and 5% other. One hundred percent of this sample are currently students with 45% presently working a part-time job in addition to pursuing their degree. Eight percent reported having worked in radio. Also, 14% report commuting by car, with 7% reporting that they commute by bus. The median age of this

sample is 20 years, with the entire sample included in the single 18-34 audience age category used by the radio industry. Ninety-four percent reported that they had listened to the radio during the day or night before they completed the survey instrument. Thus, this sample is approximately half male and half female, primarily caucasian, and the clear majority are radio listeners with a mean listening time the day before of 100 minutes a day. Due to the fact that this entire sample of 110 instruments is included within the 18-34 audience age bracket, traditional audience segmentation procedures yield only two audience segments, the 18-34 male group, and the 18-34 female group, within this sample.

The nature of this sample is distinct in that is is not a representative random sample of the local FM radio market and is strongly stratified according to several attributes. As these data show, the sample was strictly 18-34 students and thus most are primarily active in pursuing higher education which implies a skew towards broader scholastic experiences, decreased mobility, and not being at maximum economic productivity at this stage of their lives, in comparison to non-students. University students also tend to be representative of higher socioeconomic strata than the median of the general population. Further, a sample of students suggests that this group is relatively childless and unmarried. Consequently, any interpretation or extrapolation of these data beyond the present study must be weighted accordingly. While the characteristics of the applied methodology may be easily transporatable across various practical applications, the

specific and particular theme findings should not be extrapolated as applicable to non-student populations. As a result, this sample provides a useful single test case for further examination. Within this test case, segments can be studied by format preference procedures.

Format Preferences. This study focuses on discriminating radio format segments by a geometric distance method. An alternative phrasing of this is to ask if geometric distance measurement techniques, particularly those of metric multidimensional scaling, can reveal useful discriminations among format categories beyond those offered by the traditional age and sex breakdowns. In other words, are the currently used audience segmentation methods at the limit of our ability to discriminate radio listening sub-audiences?

Depending on the application, whether industry or academic, audience discrimination can be improved to meet the needs of various user communities, particularly those interested in studying the responses of the audience and their radio related behaviors and those interested in radio commerce seeking profiled audiences that can be resold to advertisers in terms of commercials. Industry research has developed various sets of format labels as reviewed in Chapter II. These labels are useful to industry for profiling audiences but they are not as informative to the academic researcher nor directly applicable to the design of research instrumentation. For this, format labels are desired that are in the colloquial language of the subject audience.

Two methods of generating format segments were used. In one, the sample was divided into format segments based on the geometric distance methods. In the other, segments are based on the respondent's indication of their "favorite" ranked first preference format descriptor.

For the present study, five format segments were used. These segments were identified as country-western, easy-listening, jazz, rock, and top-40. An additional "unclassified" category was used for those who either responded that their favorite format was not one of the target formats listed (e.g., favorite format of "new wave") or gave an ambiguous response (e.g. writing "long live John Lennon"). The unclassified category was also used for the geometric segmentation procedures when "ties" between two or more formats were reported by a respondent. These five formats were selected because they are primarily commercial formats that are frequently listened to by the 18-34 age segment. Also, exploratory intercept and phone interviews that asked respondents to identify their musical preferences and favorite radio stations yielded the format descriptors and the stations scaled in the instrument. It is interesting to note that standard industry format descriptions, for example "album oriented rock (AOR)" or "adult contemporary" were not found in any exploratory interviews -- not once. Rather, the common format descriptors found in the exploratory interviews included rock, top-40, jazz, easy-listening, progressive, classical and new wave. Non-commercial formats, usually classical and experimental, are not included in the primary analyses of this study and

are also assigned to the "unclassified" segment. Please note for interpretation that this is a limited set of format descriptors and selected to represent the dominant preferences of the target sample. For extrapolation into other format domains (e.g., beautiful music or inspirational music) other format descriptors would need to be identified. An advantage of the geometric family of methods is that they allow the incorporation of diverse format labels from divergent musical and programming domains and that they can all be scaled and geometrically arrayed against one and another to allow the assessment of underlying regularities and geometric similarities across domains. However, as the number of labels increases by a single label, the size of the data set per case increases at the rate of $N*(N-1)/2$ where N represents the number of labels. This can yield a dramatic and expensive expansion in analysis materiel and costs. Consequently, it is prudent to proceed on a step by step basis, using methodology which enhances numerical comparisons from study to study. The geometric methods offer this feature.

The format preference segments for this study were constructed by two distinct methods, one by using the MMDS paired-comparison responses, and the other by the respondent's top ranked format among a rank ordering of preferred formats. In Table 4.2 format preference categories are labelled as PC and RO. The PC stands for "paired comparison" and indicates that the format preference was determined by the format descriptor nearest the self-concept. These two format segment assignment methods were used in this initial study because each

is based on the primary measurement technique used in both traditional audience research (the ordinal scale) and in metric multidimensional scaling (the ratio paired comparison scale). Hence, these two methods were used to assign, respectively, the format preference segments according to the commonly used measurement techniques for each approach.

Thus, if the respondent indicated that jazz was the first ranked preference, this case was assigned to the jazz rank-ordered segment. For the paired comparison measurements, for example, if the reported difference is minimum between the self-concept and jazz, then jazz is assigned as the primary format preference for this case. Two self-concept descriptors were used in this study, "myself" and "my radio listening." These two self-concept indicators are described more fully in the next section under Hypothesis II. In order to perform the paired-comparison rankings of the formats the self-concept descriptor "my radio listening" was used. Each of the five pairs between the self concept descriptor and the format descriptors was compared with each other. The paired-comparison with the minimum score of this set provided the Pair Comparison format designator. However, some instruments did not have a single minimum between the self-concept and the format descriptors. These ties were assigned to an "unclassified" format category.

The RO in Table 4.2 stands for "rank-ordered." This indicates that the format segment is comprised of those instruments which had ranked that particular format as their first and favorite preference. One difference worth noting is that the Ranked Order categories do not allow

for any ties. That is, the format question requires a first ranking unlike the Paired Comparison segmentation strategy which allows respondents to provide equivocal responses. Thus, the unclassified segment is larger for the PC segmentation procedure. Using this table, these two format preference category schemes can be inspected together.

Format preference segments were assigned as specified above. These analyses yielded the following format preferences among this sample.

Table 4.2
Format Preferences of the Sample
Number of Respondents in Each Segment

Format Segment	Rank Order	Paired Comparison	Overlap
Unclassified	10	15	9
Country-Western	2	1	1
Easy-Listening	8	12	5
Jazz	2	6	2
Rock	63	54	48
Top-40	23	20	18
Totals:	108*	106**	83

* Missing 2 values   ** Missing 4 values

For this sample, "rock" was selected as the preferred format by the most people. The ranking of the formats in terms of their order of occurrence is (1) rock (2) Top40 (3) easy-listening (4) Jazz and (5) country-western. This ranking is irrespective of the method of generating the format segment. Also, please note the sample sizes in

these segments. Rock and top-40, which are the two largest format segments, together account for 77% of the listeners in the Rank Order segments and 70% in the Pair Comparison segments. The rock segment alone includes 58% of the Rank Order listeners and 51% of the Pair Comparison segment members. As indicated by Table 4.2, there is a high degree of overlap between the membership in each of the format categories selected by the rank-order method and the geometric distance method. This indicates a high degree of similarity in the format segments assigned by the two methods. The implications are twofold. First, the great degree of overlap between the two segmentation methods suggest that the issue of validity, in so far as this concept indicates accurate measurement of detectable variables, is in high agreement between the two methods. In other words, the methods indicate a strong agreement in the membership of the format segments generated by the alternative procedures and thus are loosely equivalent for identifying the format segments. The correlation between the codes of the rank order and the pair comparison methods is .22 which has a two-tail significance of .024, which is regarded as significant in the present study because it is below the .05 level. This suggests that the overlap between the two methods is most likely not a chance occurrence and the rank order method and the pair comparison method provide similar format category assignments. Secondly, the overlap suggests that direct contrasts between the two methods are of somewhat limited utility due to the strong agreement in membership between the Rank Order and Pair Comparison rock and top-40 segments. In both cases, the overlap exceeds

80% of common membership in the Rank Order and Pair Comparison segments. Contrasts between segments generated by alternative methods are thus difficult because it is similar to comparing an item to itself, in terms of the set relationships that are used in contrasting the memberships of the Rank Order and Pair Comparison segment schemas. While this does limit the contrasts between the two techniques, it also serves as an indicator of equivalence between the two methods which is also important. As described in the last chapter, a purpose of this research is to examine the utility of the geometric procedure for audience segmentation because the geometric procedures provide a framework for refined measurement precision and a mathematical reference system for describing the interrelationships among variables than traditional methods. This overlap provides an initial starting point for the application of the geometric methods to audience segmentation in that the format segments are identified by alternative methods which yield similar results, thus the format segments are considered not to arise as an artifact of one segment method or the other.

Table 4.3
Radio Exposure
Average Minutes Listened Yesterday

Audience Segment	Minutes PC		Listening RO
Unclassified	120 (15)		87 (10)
C & W	390 (1)		330 (2)
E - Z	157 (12)		89 (8)
Jazz	78 (6)		60 (2)
Rock	135 (54)		141 (63)
Top-40	189 (21)		191 (23)

* N responding is in parentheses

Table 4.3 indicates that several of the format categories have few members and that average minutes listening based on these figures are not very informative. For example, the 390 or 330 minutes indicated for the country-western format is based on only one or two respondents. A similar situation is seen for the jazz segment with only 6 or 2 members in the format segment. In contrast, the rock and top-40 segments have more members. For the rock segment, their average number of minutes of radio listening the day before they completed the survey instrument was 135 or 144 minutes, depending on the format segment assignment procedure used. The top-40 segments reported an average of 189 or 191 minutes of radio listening the day before based on 21 or 23 members. With the exception of the small country-western segment (1 or 2 members) who report relatively large amounts of average minutes of radio listening

(390 and 330 respectively) the top-40 segment indicates the largest amounts of radio listening and the jazz segments report the least.

Next, we review the local commercial FM stations that this sample reported listening to for at least one minute the day before completing the questionnaire. While some respondents indicated listening to other stations, notably WRIF, a rock FM station from Detroit, Michigan, the dominant share of this radio audience sample listened to Lansing, Michigan commercial FM radio stations.

Table 4.4
FM Station Listeners
by Format Segment

Formats	WILS		WJXQ		WFMK		WVIC		WITL	
	RO	PC	RO	PC	RO	PC	RO	PC	RO	PC
Unclassified	5	4	5	2	6	4	2	2	0	0
C & W	0	1	0	1	0	1	0	0	1	1
EZ Listening	1	0	1	0	6	4	1	0	0	0
Jazz	0	0	1	0	3	1	1	0	0	0
Rock	28	30	15	19	11	14	1	2	0	0
Top-40	2	2	6	6	15	16	4	5	0	0
Totals:	36	37	28	28	41	40	9	9	1	1

The listenership of several local commercial FM stations are reported in Table 4.4. These figures indicate that the listenership of these stations was highly similar irrespective of the category scheme used to assign the format segment. Inspection of this table reveals that the most listened to local FM station by this sample was WFMK, with

WILS rated second, and WJXQ ranked third. According to standard industry radio format classifications both WFMK and WVIC are "adult contemporary" and both WILS-FM and WJXQ are "album oriented rock" while WITL is termed "country-western." As indicated, WFMK ranks first with the top-40 segment, irrespective of the method of designating the format segment, and third with the rock segments. WILS was the first ranked station with the rock segment with few listeners from non-rock segments. WJXQ ranks second in two ways -- it is second with the rock segments and also second with the top-40 segments. With this sample, WITL (a country and western station) has no audience to speak of and WVIC (a top-40/rock station) has the next smallest audience and drew primarily from the top-40 segments. Table 4.4 also indicates that WFMK drew its audience about equally from the rock and top-40 segments, while no other listed station drew well from more than one audience segment. Thus, WFMK reached a more diverse musical audience than the other stations. In terms of the audience's radio listening, the rock segment was strongly distributed over three (3) commercial FM stations -- WILS, WJXQ, and WFMK, in that order, while the top-40 segment listened to WFMK first, and then WJXQ and WVIC in that order. According to standard format classifications WFMK and WVIC are both adult contemporary and thus of the same format while WILS and WJXQ are both classified as Album Oriented Rock and have the same format. Yet, for this sample, the audiences for these stations were not the same. According to the format descriptors used in this study WILS attracted a greater percentage of the rock audience than did WJXQ indicating that the simple "rock"

descriptor used by the audience can distinguish between two similarly labelled album oriented rock stations. Although both WVIC and WFMK are commercially listed as Adult Contemporary, WFMK has a greater share of the non-rock audience. None of the FM stations used is designated as top-40, yet roughly one-fifth of the sample described their favorite format as top-40, and their favorite station as WFMK. As a result, the commercial format listings do not designate audience segments precisely because in each case, for the album oriented rock and for the adult contemporary, a further discrimination could be made within the format classification by using the audience's labels for the formats, e.g., rock or top-40. In summary, these profiles suggest that distinct radio audience format segments are empirically present in this sample, and these segments differ in regard to the stations they attend. In order to investigate these segments further, it is necessary to examine underlying assumptions of the paired comparison procedures which are used to generate the geometrically based segments.

Hypotheses Tests

These hypotheses are reported in their numerical order. The specific analyses, variables, statistical tests, and decision rules are described in turn with each hypothesis. Throughout, in keeping with general practice, the alpha-level confidence interval is placed at $p=.05$. A note on the data analysis is in order before we proceed. Many of the variables in this study were measured using unbounded numerical scales. Occasionally when using these scales, numbers are reported

which are excessively large in comparison with the other numbers gathered for the variables. These wild scores, or extreme scores, have received widespread study under the title of "outliers." An outlier is a score that is extremely deviant from the others in the batch, according to assumptions of normality of the sample scores. The effect of an outlier is to dramatically increase the numerical value of the arithmetic mean in contrast with the median. Of course, in a perfectly normal, symmetric distribution the mean and the median are the same. With an outlier present the mean can be greatly inflated and perhaps uninformative. Thus, for exploratory analyses, a compromise is sought between the powerful efficiency of the arithmetic mean i.e., it uses the numerical value of each and every score, and the strong resistance of the median, i.e., modification of a miniscule set of scores, no matter how much, does not dramatically affect the the median's value. Ideally, transformations and rescaling can be used to realign scales to distributions in which the arithmetic mean and median are more in agreement with each other.

The treatment depends on those assumptions that the analyst is willing to accept -- one can assume that the extreme score is an accurate numerical representative of a variable's value; one can assume that the score, while accurate, is drawn from a population distinct from the target currently under study; one can assume that the score was drastically altered by exogenous factors; one can assume that the measuring procedure was incorrectly used; one can assume that the response did not result from presented stimuli (e.g., exogenous

factors); one can assume that the scale of response scale is distinct from the scale of analysis (e.g., logarithmic or linear in the exponents rather than the coefficients); or one may assume that the extreme score is a clerical error. Although these extreme scores average themselves out over repeated samples, repeated trials, and continuous measurement, they can distort the summary measures used in a single study. As a result, interval and ratio scales, while very informative, must be used with consideration of any outliers.

For the present study, the ratio-level data gathered by the questions reporting radio listening, album purchases, income, and the entire set of MMDS paired-comparison questions are sensitive to outliers. Generally, three options are present for treating outliers. First, they can be discarded ("filtered" or "censored"); second, they can be rescaled to a lower, yet relatively large, value; and, third, the data for the entire variable can be transformed to a scale more convenient for analysis (e.g., logarithms). The second of these options was selected for the hypotheses tests dependent upon paired comparison ratio-rule measurements. The ratio variables, positively skewed as expected, did not have many extreme scores but the paired comparison scores had several distinct outliers. In fact, one respondent in this study reported the "infinity" symbol for a paired comparison. With the exception of a few outliers, less than .1% of the total 120x110= 13,200 paired comparison scores, these distributions were well-behaved. Rather than discard these scores, they were rescaled to a much lower, yet relatively large, number. The number used for rescaling was 500. This

is five times as great as the criterion separation of 100 and greater than 99+% of the MMDS scores collected for this sample. With the exception of one respondent who reported a value of over a billion for most of the paired comparisons, most other pairs did not have extreme scores. Less than 0.1% of the scores were affected. Yet the effect of this recoding substantially reduced the calculated value of the means, standard deviations and variances, and more importantly, in each case brought the calculated numerical value of the mean closer to the target value of the median. With this simple solution for treating the outliers in this single dataset, it was neither necessary to censor scores and thus delete them from further analyses (also called "filtering") nor to engage in the comprehensive and expensive process of determining appropriate functional forms and then transforming all scores to alternative numerical scales, which is a major study in itself. While the entire transformation process may well be useful for more refined subsequent analyses, it is unnecessary for this exploratory study. Thus following MMDS convention, untransformed scores are used; in contrast to convention, outliers are not filtered and evicted from analyses but are rescaled to a lower, yet relatively extreme value.

This text now turns to the specific hypotheses presented in Chapter III. These hypotheses can be loosely divided into two sections. The first contains Hypotheses I, II, and III. These three hypotheses examine a set of conditions that need to be met in order to proceed with the multidimensional methods beyond this present study. The first of these three hypotheses examines the geometric structure of a typical

multidimensional configuration for use in radio audience research. In this manner, it is possible to reveal whether or not the set of lexical items which describe musical radio formats to these respondents are empirically multidimensional.

The second hypothesis examines the utility of the geometric distance measurements used by metric multidimensional scaling for discriminating among radio format preferences within this sample. For further research to proceed using the paired comparison measurement schema of of metric multidimensional scaling, these measurements should have a demonstrated ability to make discriminations among available audio format concepts and the self-concept. The concept of the self plays a central role in multidimensional analyses. The self-concept is used repeatedly as an indicator of geometric relationship among concepts scaled multidimensionally. For radio research, the role of the self concept is to serve as an indicator of the relationship between the self and radio formats and radio stations. Without an ability to discriminate among format types, the paired comparison measurements are of no utility as a tool for assigning audience members to audience format segments. Or, more importantly, to be used as input to a coordinate generating procedure whose results are going to be tacitly assumed to predict the coordinates of other variables. Hypothesis II examines this.

The third hypothesis examines the utility of the paired comparison measurement schema as a predictor of radio listening. An assumption is commonly made by MMDS researchers that the proximity of the self to various other concepts serves as an indicator of rates of behavior which engage that concept. This has been suggested in several other areas notably in regard to the study of smoking and voting behavior. However, the utility of the self-concept as an item for radio audience research has yet to be deomonstrated. A musician would be expected to be more proximal to their instrument type (e.g., reeds) than to another type (e.g., strings). Before this idea can be extended into the domain of radio audiences and musical formats, it is necessary to demonstrate the ability of the paired comparison scales used in metric multidimensional scaling to indicate rates of radio listening behavior. Hypothesis III tests for this effect.

The second group of hypotheses are presented to test for differences in effects between radio audience format segments that are assigned in either of two manners -- by a rank ordering of their preferences or by a geometric indicator (paired comparisons). Hypotheses IV, V, and VI investigate the two segmentation methods in regard to their accounting for differences in car radio listening, radio usage, and record album purchases. These are discussed in turn.

Hypotheses I

The first formal question of this research addresses the the issue of whether or not multidimensional methods may be used for radio audience research. If so, are the traditional euclidean manifolds appropriate for multidimensional analyses? An initial point of departure is to assess whether or not, in empirical fact, the concepts used in a typical radio audience study and the perceptions of a responding audience are multidimensional. The first null hypotheses is:

HO-I: The set of stimuli which define the domain of radio formats is multidimensional.

This hypothesis was operationalized by taking a set of format concepts, along with a set of local commercial FM radio stations, and a set of descriptors that prestudy respondents had used to describe the music they listen to and the stations that they preferred, and then extracting the dimensional structure of the scalar products matrix of all unique pair-wise mean differences that had been measured by the paired comparison scales. Sixteen concepts were scaled. These were the formats rock, jazz, country-western, easy-listening, and top-40; the commercial FM station concepts which included WITL, WVIC, WFMK, WJXQ and WILS; the descriptors relaxing, exciting, informative, and entertaining, along with myself and my radio listening as two indicators for the self concept. These concepts are listed in table 4.5 and these concepts provide for 120 unique paired comparisons.

Table 4.5
MMDS Concepts

Formats	Stations	Judgemental	Self
Rock	WILS	Entertaining	Myself
Top-40	WFMK	Relaxing	My Radio Listening
Jazz	WVIC	Exciting	
Easy-Listening	WJXQ	Informative	
Country-Western	WITL		

These pairs contain the unique paired comparisons for several spaces, particularly a format space, comprised of pairwise differences between radio formats, and a station space, which consists of the pairwise differences of a set of radio station call letters. Upon calculating the eigenstructure of the 16x16 matrix it was found that the structure of this space was multidimensional with ten (10) dimensions in real space and six (6) dimensions in imaginary space. The presence of the imaginary dimensions indicates that the geometry necessary to map this data matrix as a coordinate system is non-euclidean. This supports the alternative hypothesis that the set of stimuli which define the domain for a radio format study is multidimensional and non-euclidean.

As a further test, a space of the format concepts was generated and its dimensionality was calculated. This space was constructed from the following format items: rock, jazz, country-western, easy-listening, and top-40. After calculating of the scalar products matrix of the unique

10 mean paired comparison differences, the dimensional structure of these formats by themselves was extracted and was multidimensional with three dimensions in real space and two in imaginary space.

Table 4.6
Dimensional Structure of the Format Space

	Dimension				
	1	2	3	4	5
Concept:					
Rock	50.67	-16.68	-8.32	.06	-4.40
Jazz	-17.24	14.16	-13.46	-.02	11.97
Top-40	12.10	-4.88	17.33	.01	9.89
Easy Listening	-43.87	-27.49	.30	-.05	-6.65
Country Western	-1.66	34.88	4.15	.00	-10.82
Eigenvalue	4934.98	2474.55	567.96	-.01	-421.61
Percent of Variance	61.88	31.01	7.12	.00	-5.28

As was seen with the total space, the format space is also multidimensional and non-euclidean. Table 4.7 summarizes these findings.

Table 4.7
Hypothesis I
Dimensionality of Format Descriptors

Space	Dimensions		Percent of Variance Accounted For by	
	Real	Imaginary	Dimension I	II
Total	10	6	39%	16%
Format	3	2	61%	31%

The decision rule presented in Chapter III stated that for these format configurations to be considered as multidimensional it was necessary for the first dimension not to account for more than 90% of the variance in the space. As listed in Table 4.6, in neither space does the first dimension account for this much variance. In the total space, the first dimension accounts for 39% of the variance in real space. Yet, there are a variety of concepts mixed in with each other from several semantic domains, the self, stations, formats, and judgemental descriptors. The format space is free of the possible direct geometric disturbances from other semantic domains because the space simply includes format descriptors. In the format space, there are no other concepts present, and the first dimension accounted for only 61% of the variance in real space. The first two dimensions accounted for approximately 95% of the variance indicating that the

geometric structure of the format items as perceived by this sample is multidimensional. Both the 39% of the total space and the 61% of the format space are well below the 90% decision rule established.

These results indicate that the first null hypothesis is rejected and the alternative hypothesis I is supported. Statistical tests have yet to be developed for testing the independence of the dimensionality because the derived dimensions are orthogonal i.e., independent, by definition. This is not a comparison across variables or samples, but rather a geometric structure of the interrelationships among the variables. The percent of variance accounted for indicates the contribution of the sum of the squared orthogonal projections of the concepts on a dimension to the total squared projections, i.e., the total variance among the points, and is a percent. Thus, the configuration of radio formats is empirically multidimensional and non-euclidean for this sample.

Hypothesis II.

In order to make format distinctions with MMDS measurement indicators it is necessary that these indicators be able to statistically distinguish between variables defined in the geometric context, particularly variables representing musical radio formats. The self concept is frequently used in marketing as an indicator in preference studies in which participants are prompted to respond with judgements about the relationship of an attribute of a product or service in reference to "myself." Similar opinion has emerged in metric multidimensional scaling but has yet to be rigorously tested.

That is, while the self-concept has been widely used, at present guidelines are lacking as to whether or not differences result from using alternative self-concepts, and if so, what criteria should be used to select among them. In terms of the present study, this refers to the relative differences between a self-concept and the scaled format labels. A subsidiary question is whether or not the concept "myself" is an optimal descriptor for the self-concept rather than a concept that would be more indicative of a behavior of the self (e.g., my radio listening, my vote for, my singing). However, the primary question of this hypothesis concerns the ability of a paired comparison measurement schema to statistically distinguish among radio format descriptors and a self-concept in the geometric paired comparison context. Hypothesis II tests for this.

The second null hypotheses is:

    HO-II: The self-concept descriptor is not equidistant from the format descriptors.

To test this hypothesis the SPSS T-Test utility was used to test for statistically significant differences between the format and self concept items. Operationally, this was done in two different manners which depended upon the self concept descriptor used. In other words, this hypothesis was tested for each of two distinct self-concept descriptors. These descriptors are "myself" and "my radio listening." The concept "myself" was used as a traditional marketing indicator of the self concept. As an alternative indicator, the self-concept was indicated as "my radio listening" because this concept represents the behavior of the self in regard to membership in a radio audience.

If the self-concept is to be equidistant from the format descriptors (i.e., provide no discriminations among them), then the average difference between the self-concept and each of the descriptors must be equivalent, within statistical limits. Because these tests were between variables that are from the same sample of people, the pooled error variance was used as a corrective factor in the calculation of the T-levels and a two-tailed test for significant difference was performed. Thus, for hypothesis II, twenty T-tests were executed. Ten each for the "myself" and the "my radio listening" comparisons with the five commercial format descriptors of country-western, easy-listening, jazz, rock and top-40. Table 4.8 displays these T-Tests among format descriptors and self-concept "myself." Table 4.9 displays the results

of the T-Tests between the format descriptors and the self-concept "my

radio listening."

Table 4.8
Hypothesis II
T-Tests Among Formats & Myself

Paired Comparisons	Mean	S.D.	Diff.	t-value	p-level
Myself and . . .					
(1) Country-Western	98.0	90.2	-36.4	-4.7	.00*
Easy-Listening	61.6	82.0			
(2) Country-Western	98.0	90.2	-23.2	-2.2	.03*
Jazz	74.8	79.4			
(3) Country-Western	98.0	90.2	-43.4	-4.4	.00*
Rock	54.6	69.7			
(4) Country-Western	98.0	90.2	-36.6	-4.0	.00*
Top-40	61.4	70.3			
(5) Easy-Listening	61.6	82.0	13.2	1.8	.08
Jazz	74.8	79.4			
(6) Easy-Listening	61.6	82.0	-7.0	-.8	.43
Rock	54.6	69.8			
(7) Easy-Listening	61.6	82.0	-.2	-.0	.96
Top-40	61.4	70.3			
(8) Jazz	74.8	79.4	-20.2	-2.4	.02*
Rock	54.6	69.8			
(9) Jazz	74.8	79.4	13.4	1.6	.12
Top-40	61.4	70.3			
(10) Rock	54.6	69.8	-6.8	-.7	.48
Top-40	61.4	70.3			

N=108 instruments

Table 4.8 indicates that according to these T-tests the paired comparisons using the self-concept descriptor "myself" was able to distinguish among several of the format descriptors. However, according to these figures, the concept "myself" with these format labels was unable to provide distinctions between the format pairs of "myself and rock" and "myself and top-40," "myself and rock" and "myself and easy-listening," "myself and jazz" and "myself and top-40," "myself and jazz" and "myself and easy-listening," and "myself and top-40" and "myself and easy-listening." Thus, either the paired comparison method is of no utility, or "myself" as an indicator is of no utility for distinguishing among the easy listening, top-40, and rock formats to this sample of respondents. The other five format-myself pairs were demonstrated to differ in a statistically significant manner. Thus, Table 4.8 indicates that 5 of the 10 format-self pairs were significant and the other half of the pairs were not. More importantly, the common and popular formats of rock and top-40 were indistinguishable by the paired comparison measurements using "myself." Based on this result there is no basis for creating audience format segments using the paired comparison method with "myself" as the self-concept descriptor. According to the figures in this table, the null hypothesis II is not rejected.

As an alternative indicator for the self-concept, the item "my radio listening" was also used to indicate differences between the self concept and the radio format descriptors. The concept "my radio listening" was selected because it represents a behavior of the self in

relation to membership in the radio audience. In other words, a self

activity descriptor is used.

Table 4.9
Hypothesis II T-Tests
Format Descriptors with "My Radio Listening"

Paired Comparisons	Mean	S.D.	Diff.	t-value	p-level
My Radio Listening & . . .					
(1) Country-Western	112.8	100.9	-47.6	-5.6	.00*
Easy-Listening	65.2	70.7			
(2) Country-Western	112.8	100.9	-32.5	-2.9	.00*
Jazz	80.3	68.0			
(3) Country-Western	112.8	100.9	-74.0	-6.2	.00*
Rock	38.8	58.2			
(4) Country-Western	112.8	100.9	-56.6	-6.2	.00*
Top-40	56.2	57.4			
(5) Easy-Listening	65.2	70.7	15.1	2.0	.04*
Jazz	80.3	68.0			
(6) Easy-Listening	65.2	70.7	-26.4	-2.9	.00*
Rock	38.8	58.2			
(7) Easy-Listening	65.2	70.7	-9.0	-1.7	.10
Top-40	56.2	57.4			
(8) Jazz	80.3	68.0	-41.5	-4.7	.00*
Rock	38.8	58.2			
(9) Jazz	80.3	68.0	24.0	2.9	.00*
Top-40	56.2	57.4			
(10) Rock	38.8	58.2	-17.5	-2.1	.04*
Top-40	56.2	57.4			

* Significant at the .05 level with 107df.

At the p=.05 probability acceptance level, the criterion T-statistic is is exceeded in nine out of the ten tests displayed in Table 4.9. The only non-significant difference (at the p=.05 level) is between the self-concept and the formats of easy-listening and top-40. Significant distinctions were made among all the other self-concept and format descriptor pairings using the geometric distance method. The self-concept "my radio listening" served to discriminate among the format descriptors better than the self-concept descriptor "myself." In percentage terms, the self concept "myself" was only able to be discriminated among five of the ten pairs, while the self-concept "my radio listening" was able to be discriminated along with nine of the ten pairs. Of note, is that statistical distinctions could be made between rock and top-40, the dominant format preferences of this sample which were not evident using "myself" as the self concept. The self-activity concept did serve to provide statistical distinctions among the formats as a set. In either case, the set of format descriptors was not equidistant from the self-concept and thus, Null Hypothesis II is rejected.

Hypothesis III

Another aspect of the paired comparison geometric measurements used by metric multidimensional scaling is whether or not these measurements can serve as predictors of other related variables not in the

The third null hypothesis is:

> HO-III: The level of radio listening is predictable from the geometric distance between the self-concept and the radio concept.

This research hypothesis was designed to assess the MMDS paired comparison difference measurement as an indicator of radio listening. This was operationalized as the paired comparison difference between the self-concept designators, myself or my radio listening with other concepts, and numerical reports of "minutes of radio listening yesterday." A regression solution was used. The results of these analyses are presented in Table 4.10 The endogenous variable was the amount of reported radio listening in minutes yesterday and the exogenous variable was paired-comparison difference between myself and radio. A second test was executed using the exogenous paired comparison difference between myself and my radio listening.

Table 4.10
Hypothesis III Regression Table
Radio Exposure with Paired Comparison Differences
Endogenous Variable: Minutes Listened Yesterday

Exogenous* Variable	Unstandardized Coef. B	Intercept	Standardized Coef. Beta	Constant	p level
Myself & Radio	-.21	153.6	-.15	-.16	.12
Myself & My Radio Listening	-.49	147.8	-.20	-.12	.04*

* Based on 106 respondents.

The next table displays the significance data from the above listed regression solutions. As indicated by the lack of significance in Table 4.10, the level of radio listening was not predictable by the paired comparison difference using the concepts myself and radio. Yet the level of radio listening was predictable from the paired comparison using myself and my radio listening. Table 4.11 displays the significance figures for these regressions.

Table 4.11
Hypothesis III Significance Table
Radio Exposure with Paired Comparison Differences
Endogenous Variable: Minutes Listened Yesterday

Exogenous Variable		df	Sum of Squares	F ratio	p level
Myself	(Reg.)	1	4.3×10^4		
&				2.49	.12
Radio	(Resid.)	105	6.8×10^6		
Myself &	(Reg.)	1	7.6×10^4		
My Radio				4.51	.04*
Listening	(Resid.)	105	1.7×10^6		

* Significant at the p=.05 level.

In order to provide a further test of this hypothesis another indicator of radio listening was used as an endogenous variable. The analyses presented in the last two tables is repeated for car radio listening. This analysis provides an indication as to whether or not the geometric method can be used as an indicator for predicting away form home car listening, as well as testing the role of the behaviorally based self-concept descriptor "my radio listening." A sub-sample of the data was extracted for this analysis. All those respondents that indicated that they listened to a car radio the day before were included. This was a total of 57 respondents.

Table 4.12
Hypothesis III Regression Table
Car Radio Exposure with Paired Comparison Differences
Endogenous Variable: Car Minutes Listened Yesterday

Exogenous* Variable	Unstandardized Coef. B	Unstandardized Coef. Intercept	Standardized Coef. Beta	Standardized Coef. Constant	p level
Radio & Riding in a Car	-.72	24.7	-.07	-.12	.49
Riding in a car & My Radio Listening	1.09	28.3	-.30	-.44	.02*

* Based on 57 respondents.

The next table displays the significance data from the above listed regressions solutions. As indicated by the lack of significance in Table 4.13, the level of car radio listening was not predictable by the paired comparison difference using the concepts riding in a car and radio. Yet the level of radio car listening was predictable from the paired comparison using the concepts riding in a car and my radio listening. Table 4.13 displays the significance figures for these regressions.

Table 4.13
Hypothesis III Significance Table
Car Radio Exposure with Paired Comparison Differences
Endogenous Variable: Car Minutes Listened Yesterday

Exogenous Variable		df	Sum of Squares	F ratio	p level
Riding in	(Reg.)	1	2.3×10^3		
a car &				.47	.49
Radio	(Resid.)	56	5.1×10^5		
Riding in					
a car &	(Reg.)	1	4.0×10^3		
My Radio				5.68	.02*
Listening	(Resid.)	56	4.0×10^5		

* Significant at the p=.05 level.

A regression coefficient of zero (0) at a significant probability level of at least .05 supports the null hypothesis. The actual calculations produce regression coefficients which are not zero and yet are significant at the .05 level for both radio listening and car radio listening when predicted by a behaviorally based self-concept descriptor (i.e., my radio listening). However, for both effects, the amount of variance accounted for by the regression solution in either case is less than 10% of the total variance. Thus, at the p=.05 level, Null Hypothesis III is rejected and the alternative hypothesis that reports of radio exposure in this sample are predictable from the geometric paired comparison scales used by multidimensional scaling is accepted in

its place.

This acceptance is qualified, however, because of the wording of the hypothesis and the contrasting signs of the significant regression coefficients. With these coefficients the signs, more than the numerical values of the coefficients themselves, are of interest. This is due to scaling of the endogenous and exogenous variables. With scales of minutes and paired comparison differences, the actual numerical value of the coefficients is highly dependent upon the scaling of the variable used, minute or hours, for example. A choice of a different scale will yield a different coefficient. The significance of a regression coefficient answers the question as to whether or not the dependent variable was accounted for by the independent variable. The sign of the significant coefficient indicates the direction of the relationship, Table 4.10 presents a negative regression coefficient while Table 4.12 displays a positive regression coefficient. As traditionally accepted, a proximal relationship between the self-concept and another concept is an indicator of rates of behavior toward that other concept. For this hypothesis, this means that the closer that the self is to radio listening concepts, the larger the expected amount of radio listening will be. This was the direction supported by the regressions in Table 4.9, but this is in contrast with the results displayed in Table 4.11 in which the sign of the regression coefficient is positive. Consequently, the null hypothesis, as worded, is rejected.

Hypothesis IV

The fourth hypothesis was designed to assess the utility of the geometric procedure of audience segmentation by format preferences for discriminating away-from-home car radio listening. Hypothesis IV is:

> HO-IV: A geometric method accounts for a greater percentage of the variance in away-from-home car listening than traditional market segmentation measures.

This hypothesis was operationalized by segmenting the sample according to the preference format descriptors by the rank order and the paired comparison procedures discussed with Table 4.2. These analyses were executed with a subsample of the instruments from the study. For this hypothesis, only those instruments which indicated at least one minute of car radio listening yesterday were used. This is the same base as used in the prior car listening regression analyses. Using the verbal report to the question "how many minutes yesterday did you listen to the radio in a car?" as a the dependent indicator of radio exposure, an analysis of variance was performed among the six format groups of unclassified, country-western, easy listening, jazz, rock, top-40 accordingly for each of the format segmentation procedures. Thus, two analyses of variance were performed, one for the rank ordered format segments and one for the paired comparison segements. These are displayed in Table 4.14. In this table, the "between" groups refer to the format segments established by the rank ordering or the paired comparison segments respectively. The "within" group refers to the mean

squares within a format segmentation scheme, either paired comparison or rank ordered.

Table 4.14
Hypothesis IV Analysis of Variance
Car Radio Listening by Format Segments

Source	Sum of Squares	df	Mean Square	F Ratio	p-level
*Rank Ordered					
Between	3.8×10^4	5	2.7×10^4		
Within	1.4×10^6	52	$2.6.10^4$	2.79	.03*
*Paired Comparison					
Between	4.9×10^4	5	1.2×10^4		
Within	1.8×10^6	52	3.4×10^4	.36	.83

According to the data presented in Table 4.14, only the rank ordered method of format assignment provided for a significant discrimination among the target audience away from home car listening. The geometric method of paired comparisons did not provide any discriminations at all (the test was not significant) and thus the null hypothesis is retained and the alternative hypothesis, as worded in HO-IV is not accepted. Thus, the geometric method does not explain more variance than the traditional measure. These data are based on 57 respondents.

Hypothesis V

The fifth hypothesis was designed to assess radio station listening according to the rank ordered and the paired comparison segmentation methods. Hypothesis Five is:

> HI-V: A geometric method accounts for a greater share of the variance in radio station selections than traditional unidimensional measures.

For purposes of this study, Hypothesis V was operationalized as the radio station listening reported by the audience according to format segment. In order to provide a precise examination of this hypotheses the analysis was constrained to just the rock and top-40 format segments. The unclassified, easy-listening, country-western, and jazz segment members were excluded. This hypothesis thus presents a test contrasting the two segment assignment techniques. The variables of the analysis are the format segments and the three dominant commercial FM stations that these people report listening to, WFMK, WILS, WJXQ. In a chi-square analysis, the null hypothesis is one of independence, in contrast to more conventional approaches in which the null is usually one of "no difference." Thus, the null hypothesis in this case assumes that differences exist among the station selections of these audience format segments. Hence, significance in this case is identified when the value of a computed chi-square does not exceed a theoretical critical value for the chi-square with (3-1=2, 2-1=1) degrees of freedom. This is a single tail test. These results are displayed in

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Table 4.15.

Table 4.15
Hypothesis V
Station Selections

	Rank Ordered				Paired Comparison		
	Rock	Top-40	Total		Rock	Top-40	Total
WILS	21	2	23		20	2	22
WFMK	7	11	18		4	10	14
WJXQ	10	1	11		9	1	10
TOTAL:	38	14	52		33	13	46
	Chi-square:		1.49		Chi-Square:		1.40
	Critical Value:		5.99		Critical Value:		5.99

As indicated by Table 4.15, the geometric method of assigning
format segments was equivalent in comparison with the rank ordering
method to the extent that they both produced chi-square values that did
not reject the null hypothesis of independence between the format
categories. Again, specific discriminations between the two systems of
format group assignment seem not to differ greatly, which is no surprise
given the fact that the two groups overlap to such a great degree. The
notable finding of this hypothesis is that both format segmentation
procedures were supported in regard to their ability to discriminate the
radio station selections of this sample.

Hypothesis VI

Hypothesis VI assesses market segmentation by format and product usage patterns among audience members in specific regard the their musical album purchases. The wording of this hypothesis is:

> HO-VI: The geometric method accounts for a greater share of the variance in record album purchases than traditional segmentation measures.

Operationally, this hypothesis was assessed according to respondent's reports of album purchases in the past six months according to the format categories of classical, country-western, easy-listening, jazz, rock, top-40, and other. The Rank Order and Pair Comparison audience segments were used.

Table 4.16 displays the album purchase reports of this sample according to their formats. The largest purchase category was rock. The rank order of the format categories of album purchases is (1) rock (2) top-40 (3) easy listening (4) classical (5) jazz (6) other (7) country-western. Album purchases were measured with the industry Simmons style questions of "how many record albums did you buy for yourself or for someone else in the past six months?" These were presented in a tabular form which allowed the respondent to indicate the number of purchases that they had made according to specific musical format types. The listings in Table 4.16 use the category labels of "PC" for pair comparison and "RO" for the rank order segments again.

Table 4.16
Album Purchase by Format Type
According to Format Segment

Format Pref	n	total	Album Purchases					
			Class	C-W	E-Z	Jazz	Rock	Other
Unclass								
PC	(15)	25	1	3	3	4	11	3
RO	(10)	22	0	2	4	5	5	6
C-W								
PC	(1)	1	0	1	0	0	0	0
RO	(2)	2	0	1	1	0	0	0
E-Z								
PC	(12)	25	4	2	7	6	3	3
RO	(8)	21	5	3	6	2	3	2
Jazz								
PC	(6)	18	5	2	2	3	3	3
RO	(2)	7	2	0	0	2	2	1
Rock								
PC	(54)	104	11	4	20	14	42	13
RO	(63)	105	11	0	17	16	48	13
Top-40								
PC	(20)	46	5	3	15	5	11	7
RO	(23)	51	4	4	8	7	12	16

These album figures indicate that rock was the most purchased category. Also, that the rock and top-40 purchases together accounted for 69% of the rank order segments purchases and 75% of the paired comparison segment's album purchases. Yet, on a segment to segment basis is there a discriminable difference in album purchases according

to either the paired comparison geometric assigment method or the rank order format category assignment method. The next table displays and analysis of variance which addresses this question.

Table 4.17
Hypothesis VI Album Purchases
Analysis of Variance by Format Segments
Dependent Variable: Album Purchases

Source	Sum of Squares	df*	Mean Square	F Value	p level
Rank Ordered					
Between	4.4×10^2	4	88.1		
				.41	.84
Within	2.2×10^4	104	214.7		
Pair Comparison					
Between	5.0×10^4	4	100.7		
				.48	.79
Within	2.2×10^4	104	210.2		

* Based on 105 respondents across 5 groups.

As indicated by Table 4.17, neither method of audience segmentation, in general, served to discriminate statistically significant differences among the segments in regard to their total album purchases. Neither the rank ordered method nor the geometrically assigned segmentation method served as a useful indicator of album purchases in general among the categories discriminated by these methods in that no significant differences were identified among the format

segments. Hence, according to the wording of the hypothesis, the geometrically derived segmentation procedure is not superior to the traditionally derived rank ordered format preference category because neither was significant. Hence, the null hypothesis for hypothesis VI is retained, and the formal wording of the alternative hypothesis presented in HO-VI above is rejected.

As a comparison, Table 4.18 displays an analysis of variance of album purchases according to the sex of the purchaser because the entire sample is within the 18-34 bracket, and also that age and sex are the primary traditional marketing breakdown variable for this audience category. These analyses were carried further to investiate the breakdown of radio listening and car radio listening according to the sex demographic.

Table 4.18
Album Purchases
Analysis of Variance by Sex of Purchaser
Dependent Variable: Album Purchases

Source	Sum of Squares	df*	Mean Square	F Value	p level
Sex					
Between	2.6×10^2	1	262.7		
				1.28	.26
Within	2.2×10^4	104	204.7		

*Based on 2 groups, 105 respondents

Table 4.18 displays a non-significant analysis of variance figure for the distinctions between males and females in regards to their level of record album purchases. This non-significant probability level indicates that even the traditional method of dividing an audience segment according to the sex of members is not as informative as to product usage when indicated by album purchases.

For radio listening (operationalized as number minutes listened yesterday) and using sex as the independent factor, an F ratio of .01 was calculated and yielded a .92 level of probability. This is non-significant according to the alpha=.05 level decision rule adopted for this study. Using car radio listening as the dependent measure (operationalized as the number of minutes of listening to radio in a car

yesterday) and sex as the independent factor, the F ratio of 1.54 with an accompanying significance level of .22. Please note, none of these figures are significant. These analyses indicate that the traditional variable of sex did not provide any distinctions in this audience in regard to level of radio listening either at home or in the car, or in regard to their album purchases. Thus, the primary marketing segmentation variable of sex did not serve to discriminate purchase groups with this sample of radio listeners and album purchasers. As indicated above, the rank order method did demonstrate a significant discrimination among audience segments. Thus, the segmentation procedure by format preferences shows and advantage to the traditional method of age-sex segmentation in regard to radio listening and album purchases. Although the geometric segments did not yield any significant distinctions among the segments in regard to their radio listening and album purchases, when all five format groups are taken into account, both format preference segmentation procedures produced an empirically discrimination among radio station station selections as a function of audience format segment.

Hypotheses Summary

Six primary null hypotheses were tested. Three of them were rejected. These hypotheses are now compactly summarized in Table 4.17.

Table 4.19
Hypotheses Summary Table

	Null Hypotheses	Result
HO-I	(Format descriptors are unidimensional)	REJECTED
HO-II	(Format-Self Pairs Equidistant)	REJECTED
HO-III	(Geometric Indicator & Radio Exposure)	REJECTED
HO-IV	(Geometric Indicator & Car Radio)	ACCEPTED
HO-V	(Geometric Method and Station Selections)	ACCEPTED
HO-VI	(Geometric Method & Album Purchases)	ACCEPTED

Table 4.19 summarizes the hypotheses tests executed for this research. As is indicated three of the null hypotheses were rejected. Thus, these tests indicate that the geometric method serves well as a discriminator among radio formats and the self-concept; and that a behaviorally based self-conception item (my radio listening) was found to be more useful than the commonly used self-concept "myself." The geometric method also serves well as an indicator of other non-geometrically represented variables (e.g., radio listening both at home and in the car). However, even with the extreme degree of overlap between the membership of the format segments, the rank ordered format segments was the only one to yield a significant difference, when all the scaled formats are taken into account.

Exploratory Analyses

The segments used for these exploratory analyses are the same segments described earlier in this chapter that were generated with the paired comparison and rank ordered measurement methods. In this context, the hypothesis tests served to examine the paired-comparison measurement techniques used by metric multidimensional scaling in specific relation to their utility in studying the radio audience and and a subset of contemporary formats. Subsequent to these tests, general spatial indicators for the MMDS analyses can be assessed within the contexts of the findings of the hypotheses tests.

Multidimensional methods have alternative interpretations which are of interest here. The data gathered for use in metric multidimensional scaling is conventionally generated according to a ratio rule by the method of complete paired comparisons. A metric is used in generating these data in the form of a unit of numerical comparison. For example, "If the difference between rock and jazz is 100 units, how different are Jimi Hendrix and Yardbird Parker?" The respondent answers with a number. Once gathered, these data are conventionally summarized by calculating the arithmetic mean for each pair, across all the responses for the pair. Rather than provide a set of individual measurements, these mean differences, or average dissimilarity between items in a pair, provide an indicator of an aggregate average.

Multidimensional data are gathered and treated as set of data and its interrelationships. Multidimensional technically means more than one dimension. A crosstabulation, for example, is multidimensional in that the data are configured in a matrix form of interrelationships. An alternative definition of multidimensional refers to only the resulting orthogonal factors of the roots and eigenfunctions of a scalar products matrix as dimensions (or factors). For the present study, multidimensional is used to indicate a set of measurements, or a vector of values, is used in analysis.

The more advanced applications of numerical analysis to these data matrices may involve the complex orthogonal factoring of the scalar products matrix into a set of coordinates in Riemann space or the application of discriminant or clustering algorithms on the pairwise mean differences or coordinates. This is also known as the eigenvector matrix. Whatever the case, these advanced applications are dependent upon the initial characteristics of the input paired comparison data, and the statistical and computing procedures that generate their summary measures. In other words, these paired comparison data are the raw material from which the other results are crafted. Thus, in this initial multidimensional study of the radio audience, the scope of the exploratory analysis is constrained to a review of particular mean differences among concept pairs that are of interest in radio format segmentation. It is necessary to examine the characteristics of these data and their applicability to audience segmentation prior to engaging in further studies investigating the radio audience by more refined

trigonometric methods. These exploratory analyses address one basic question concerning audience segmentation: "Are format perceptions of this sample multidimensional and euclidean?" In order to assess this, a series of MMDS runs were executed on all the segments described in order to calculate the trace, dimensionality, and non-euclidean curvature of the format perceptions of each segment. These exploratory analyses further illuminate the relative degree of homogeneity among the perceptions of distinct audience segments.

A numerical indicator of homogeneity is provided by the trace of a matrix. The trace is the sum of the roots of the eigenvector matrix. In this matrix, the pairwise dissimilarities among the scaled concepts are represented as coordinate projections (or factor loadings in less precise terminology). The greater the difference is between two items, the greater will be the sum of the squared numerical differences between their coordinates. The greater that the number of underlying factors which serve to discriminate between the two items, the greater will be the number of distinct coordinates spanned by the initial paired comparison difference between the two scaled items. Thus, with increasing differences among increasingly distinct items, upon increasingly distinct attributes, the number and magnitude of the coordinate projections likewise increases. When these projections are squared and summed the resulting value is termed a root of the matrix. When the set of roots for a matrix is summed, the resulting figure is termed the trace. Hence, the trace serves as an indicator of homogeneity among the responses gathered for the scaled items in that a

relatively large value for the trace indicates greater heterogeneity (i.e., aggregate differences), while a relatively low numerical value for the trace indicates less heterogeneity and hence greater homogeneity.

The exploratory geometric analyses were performed using custom software, SPSS, and the Galileo metric multidimensional scaling computer program. These analyses were designed to provide multidimensional mean differences matrices and also to generate geometric indicators. Prior to these computer runs it was necessary to rearrange and split the sample into contrasting segments for further analyses. The segments are the same segments used for the hypotheses tests -- the format segments of rock, jazz, top-40, easy-listening, and country-western. Of these five groups, only the rock segment with 53 people and the top-40 segment with 21 members had a sufficient number of members for aggregate analyses. Consequently, most of these analyses are constrained to three general datasets -- everybody, the paired comparison rock segment, and the paired comparison top-40 segment. Summary tables of these analyses are provided below.

Several MMDS spaces can be represented by the distinct pairs used in the survey instrument. For purposes of the present analyses, two of these spaces are used. These are the format space which includes all unique paired comparisons of the concepts listed in the format column, and the total space which includes all unique paired comparisons of the concepts listed in the study. The format space is used because it provides an indication of the dimensionality of format perceptions of

this sample. Likewise, the total space is examined to ascertain whether or not the set of concepts used in a radio study forms an euclidean multidimensional configuration for this sample. Also, the relationships among the format and the station concepts and their relations to the self-concept provide an indicator as to the utility of these measurement procedures for subsequent audience analysis.

Table 4.20
Multidimensional Spatial Indicators
Total Space and Format Space for
Everybody, and the Rock and Top-40 Segments

Segment		Warp Factor	Trace	Dimensionality Real	Imag.	Acct. Var. First	Last
Total Space							
Everybody	(108)*	1.24	37258	10	6	39.3	-9.2
PC Rock	(54)	1.37	43005	10	6	45.5	-9.8
Top-40	(20)	1.28	31710	11	5	37.5	-9.5
RO Rock	(63)	1.31	42802	10	6	43.5	-10.0
Top-40	(23)	1.27	31353	11	5	38.5	-8.9
Format Space							
Everybody		1.06	7559	3	2	61.9	-5.3
PC Rock		1.00	7327	4	1	70.7	-0.3
Top-40		1.27	9453	3	2	56.9	-21.4
RO Rock		1.03	7365	4	1	70.5	-2.5
Top-40		1.29	8934	3	2	56.8	-22.7

* Cell size is given in parentheses

This summary table (Table 4.20) displays the traces and warp-factors for each of two spaces, the total and the format spaces. Five calculations of each space are provided, the total sample, and then each of the Pair Comparison and Rank Order sets of respondents. Several interesting entries in this table are evident. First of all, please note that each segment is multidimensional as indicated by the percentage of variance accounted for by both the first and the last dimensions of the space. The column "last" in Table 4.21 refers the the largest imaginary dimension in the space. Another way to interpret this column is that the "last" dimension of a space is the largest of the imaginary dimensions. In no single case does the first dimension account for more than 71% of the variance in the space. The spaces which are least imaginary are the rock format spaces. As indicated by the table, the amount of variance accounted for by the projections on the largest imaginary dimension in the rock format spaces are -.3% and -2.5% In contrast, over 21% of the variance in the space for the top-40 segment was projected on the largest imaginary dimension. Two possibilities are suggested for this effect. First, as indicated by the data, the conceptual space of musical formats may be quite complex (in the mathematical sense) relative to the musical format perceptions of the rock segments. However, these analytic differences could also result from the small sample size of the top-40 segment, in which the presence of several outliers could warp the space, and the reason that the rock segment is more euclidean is due to the averaging effects of the larger sample size. However, another figure deserves attention.

In the total space, which is based on the same sample size as the format space, the top-40 segment results in a lower percentage of variance on the imaginary dimensions than the rock segments. For the sample size to be an issue in one instance, it should also be in the other. Consequently, these data point to considering the format perceptions of the top-40 segment as more mathematically complex than that of the rock segment.

The warp-factor is a useful MMDS indicator. This figure is the ratio of the absolute value the sum of the roots of a geometric space to the sum of the roots in real space. A number of 1.0 indicates a euclidean space. As this indicator increases, it represents an increasing curvature of the spatial manifold. As the manifold increases, multidimensional methods which rely on euclidean assumptions yield increasingly erroneous results by overestimating inter relationships among the points in the space. An inspection of the warp-factor column in table 4.20 displays that the rock segment format space is practically euclidean. The total space is not. Together these figures suggest that total space is non-euclidean and that metric multidimensional methods are appropriate for analyses of radio audience segments. Further, the total space is comprised of concepts from several different semantic domain, stations, self-concepts, formats, and judgemental descriptors. The curved space is present, as indicated by the warp-factors greater than 1.0, in all the segments for the total space. This suggests that should the format space itself be demonstrated to be euclidean, that the geometry of incorporating the

format concepts with items form other semantic domains requires a non-euclidean geometric procedure.

As mentioned earlier, the trace provides and indication of the relative homogeneity among the perceptions of the sample. The traces listed in table 4.20 indicate that rock segment, for the format space, was more homogeneous than the top-40 segment, yet this result was reversed for the total space. In the total space, the top-40 segment had the smallest trace, which would indicate the greater degree of homogeneity. The interesting observation here is that rock segment in the total space includes the format space concepts, thus the greater degree of heterogeneity among the total space must result from the interrelationships of other items in this study to the format concepts. This finding suggests that the degree of homogeneity in regard to a specific set of concepts, such as the formats, does not directly indicate homogeneity among other concepts, particularly other concepts that would be required to complete a study of the radio audience. Thus, in this study, the presence of the self-concepts, the station concepts, and the judgemental descriptors, yielded a greater heterogeneity among the rock segment. Said simply, the trace of the rock segment, while indicating a relatively homogeneous set of perceptions among format descriptors, does not exhibit the same degree of relative homogeneity once these format descriptors are entered into relationships with other variables. That is, while these segment members are relatively similar in regard to their perceptions of musical formats, this similarity disappears once these format concepts are related to concepts of the

self and radio stations. As a result, these findings suggest that the rock segment, while indicating similarity in regard to musical formats, do not show similarity in regard to the relationships among the other scaled concepts of stations, judgements, and the self. This suggests that the trace, as an indicator of homogeneity is limited by the inclusion of concepts in the space which are from diverse semantic domains such as the non-format concepts of the stations, self, and judgements.

The results and findings of Hypotheses II and III, and the above described exploratory analyses, suggest that the self-concept descriptors used in this study receive closer scrutiny. As was demonstrated under the discussion for hypotheses II and III, the behaviorally based self-concept ("my radio listening") appeared to be superior to the general self-concept ("myself") in regard to discriminating among radio formats as well as serving as a significant relationship to other non-geometrically based variable measurements. Table 4.21 displays the relations between each of the self-concepts to each of format category descriptors used in the study.

Table 4.21
MMDS Formats and Self-Concepts
Mean Differences Between Pairs

Self-Concept	Formats				
	Rock	Jazz	Top-40	EZ List.	C & W
My Radio Listening					
All (106)	38	80	56	65	113
Rock (54)	14	96	77	85	131
Top-40 (20)	74	75	12	49	77
Myself					
All (106)	55	75	61	62	98
Rock (54)	43	82	77	79	120
Top-40 (20)	81	68	19	45	71

* Cell size given in parentheses

Table 4.21 presents the paired comparison mean differences between the self-concepts and the format descriptors. The cell entries indicate the average difference, across the reporting respondents, to a specific paired comparison question. For example, cell 1,1 (row 1, column 1, value=38) displays that for the entire sample (all) the average reported difference between "my radio listening" and "rock" was 38 units. In contrast, the average difference between "my radio listening" and "country-western" (C & W) was 113 units -- about three times as much. These MMDS indicators suggest that the radio listening of this sample was more tuned to rock stations and rock music than to country western. This matches the trend of the data of the sample's radio listening

presented in table 4.4. This example provides an explanation of the table entries.

For all respondents, the two closest concepts to the self-concept descriptor "my radio listening" are rock at 38 units and top-40 at 56 units. This is consistent with the finding that the sample breaks down into two (2) primary groups, a rock and a top-40 segment. Please note that rock, the largest group, has the minimum mean distance from "my radio listening."

When we examine "myself" in this table, the same two categories of rock and top-40 are rank ordered in distance away from the self-concept with easy-listening practically indistinguishable from top-40. This is consistent with Hypothesis II which indicated the inability of the self concept "myself" in a paired comparison format to statistically distinguish among rock, top-40 and easy listening. This is problematic for MMDS analyses in because without a demonstrated ability for the measurement schema to distinguish among items of interest, further trigonometric analyses that depend upon derived coordinate systems would be highly entropic and their use misleading.

Not to be overlooked is that these paired comparison measurements, at the aggregate level of analysis, when rank ordered away from the aggregate self-concept, is in the same relation as the ranking of the size of the audience format segments. In other words, rock is the largest format segment of this sample; it is also closest to "my radio listening." Similarly, top-40 is the next largest difference away from the self, and also the next largest format segment, and so on to country

western which is both the farthest format from the aggregate self-concept, and the smallest format segment.

A further examination of Table 4.19 reveals that within each of the format segments, the format indicator of their format segment is dramatically closer to the self, thus indicating a distinction in the group musical identity of this format segment. In both segments, the self-concept was closest to the format identification of that segment. In each case, "my radio listening" was closer to the format concept than "myself." As suggested by Hypothesis III, the self-concept "my radio listening" provides an empirical link between paired comparison measurements and other ratio variables that are measured in a non-geometric perception manner (e.g., minutes of radio listening).

Consequently, the behaviorally based self-concept indicator is superior to the simple self-reference of "myself" in regard to discriminating among format categories and relating these measurements to external, non-geometric, ratio measurements. That is, it provides for greater discrimination among concepts and provides an empirical linkage of these discriminations to other indicators. In either case, but more clearly with "my radio listening," the ranking of formats away from the aggregate self concept matched the order of decreasing size in the membership of those format segments. Thus, the geometric MMDS paired comparison measurement served as an indicator of format segment size as a function of distance from the aggregate self-concept.

Table 4.22 displays the mean differences between the self-concepts and the scaled commercial FM stations. Again, both self-concepts are presented.

Table 4.22
FM Stations and Self-Concepts
Mean Differences Between Pairs

Self-Concept		Stations				
		WILS	WFMK	WJXQ	WITL	WVIC
My Radio Listening						
All	(106)	49	52	45	103	59
Rock	(54)	36	68	29	130	73
Top-40	(20)	75	19	75	73	33
Myself						
All	(106)	57	49	39	106	60
Rock	(54)	49	67	40	127	78
Top-40	(20)	82	22	72	88	30

* Cell size given in parentheses

According to this table the closest station to the total sample's self-concept is WJXQ for both "my radio listening" and "myself." The radio stations ranked away from the self are WJXQ, WILS, and WFMK. This is reverse from the actual audience figures of listening and station selections provided by the sample in their individual listening diaries. This effect is particularly notable for the rock segment in regard to both self-concepts. In each case, the self is closer to WJXQ than to

WILS. Yet, according to the listening diaries, WILS dominates the rock audience. In contrast, the top-40 segment, who are dominated by WFMK, show this station to be closest to the self. Using "myself" as the self concept indicator reveals the same findings. With either self concept, the top-40 segment is relatively close to WFMK, their most listened to station. WILS, the most listened to station by the rock segment, was not closest to the self, WJXQ was. This is of interest because as displayed in Table 4.23, the next table, WILS is the closest concept to rock in the perceptions of this sample. However, for the rock segment (the largest segment) WJXQ was also recognized as a rock station. For this sample, the rock stations are clearly WILS and WJXQ. The dominant top-40 station to this sample is WFMK, as indicated by all segments.

Table 4.21
MMDS Formats and Stations
Mean Differences Between Pairs

Format Segment		WILS	WFMK	WJXQ	WITL	WVIC
Rock						
All	(104)	22	60	26	94	66
Rock	(54)	24	58	31	101	73
Top-40	(20)	4	60	11	72	57
Top-40						
All	(104)	75	31	70	81	29
Rock	(54)	84	36	67	88	33
Top-40	(20)	74	8	75	69	14

* Cell size given in parentheses

As indicated by this table, WFMK is closest to top-40 for all segments, and WILS is closest to rock for all segments. This is consistent with earlier findings that WFMK is the predominant station listened to by the Top-40 segment, and that WILS is the station which dominates the listening of the rock segment. The contrasts in mean differences between the perceptions of the format descriptors and the stations as a function of format segment are notable. For example, the top-40 segment viewed the rock stations (WILS & WFMK) nearly 9 times more distant from top-40 than their preferred station, WFMK, which was calculated as 8 units. For the rock segment, WILS was calculated as a little more than twice as far from the top-40 format descriptor than was

WFMK.   These figures suggest that the geometric indicators do serve to discriminate the format types of stations, and further that the paired comparison differences serve to discriminate the stations and the formats from each other.

The MMDS exploratory findings suggest that MMDS paired comparison indicators has strong potential for segmentation research, and that the data requirements of metric multidimensional scaling are met by these geometric indicators.   As indicated by the exploratory analyses, the spatial structures of the format descriptors are multidimensional. Also, the geometric configuration of the study concepts when included with other concepts such as the self, is multidimensional and non-euclidean which suggests that multidimensional methods which map general manifolds, as in Riemann space, are more appropriate for analysis of radio audience format perceptions.

Two general characteristics of the audience segmentation are of note.   These are format preference segments as indicated by the proximity of the self and format descriptors, and the proximal location of the local FM stations and the format descriptors to each other; the other is the effect noted in the rank ordering of formats from the aggregate self.   As described above, the proximity measurements of these paired comparison scales served to clearly discriminate among format preferences and provide indicators of format segment membership and format listening, although the data for station selection was equivocal. The relationship of the format descriptors to the aggregate self provided an indicator of the sizes of the format segments within this

sample.

Summary

This chapter presented six hypotheses tests regarding the geometric methods of multidimensional scaling. The first hypothesis examined a set of typical lexical items for MMDS radio audience analysis in regard to the dimensionality and euclideanism of the geometric configurations of these data structures. This hypothesis demonstrated that the configurations are both multidimensional and non-euclidean; thus, general non-euclidean multidimensional measurement methods are appropriate for radio audience research.

The second hypothesis tested the utility of MMDS paired comparison indicators to discriminate among musical format descriptors which is a necessary condition for multidimensional analyses to proceed based on this type of measurement data. The results to this hypothesis suggests the self-concept can be used to discriminate among format descriptors but that a behaviorally based self-concept, such as "my radio listening" provides greater discrimination ability than a self-reference such as "myself."

The third hypothesis tested the utility of the MMDS paired comparison measurements to provide an empirical linkage to other radio audience variables not measured in the geometric paired-comparison context. Again, similar to hypothesis II, the behaviorally based self-concept descriptor served to provide an empirical linkage better than

the self-reference. The rejection of the null hypotheses for these three hypotheses tests suggests that the paired comparison metric measurement procedures used by metric multidimensional scaling do, in empirical fact, serve to map formats, radio listening, discriminate among competing formats, and provide a geometric space that is both multidimensional and non-euclidean. The next three hypotheses provided an examination of the paired comparison based format segments.

In this sample, the membership in the format segments was very similar whether the format segment was constructed from rank orders or from the MMDS paired comparison indicator. This suggests that there is a high degree of agreement between the structuring of format groupings, or segments, whichever method is used. Consequently, straight forward and contrasting comparisons of these methods were uninformative due to the great degree of overlap in the membership across the compared segments. Hypothesis IV examined the two segmentation methods in regard to their ability to discriminate format segments differences in regard to car radio listening. Hypothesis V examine the two methods in regard to radio station selections, and Hypothesis VI examined the album purchases of these segments. The findings were that the rank ordered method was superior in one instance but tied with the paired comparison method in all other situations. The most important finding of these analyses was that in each case, either with the rank ordered methods or with the paired comparison methods, the process of segmenting the audience according to their format preferences was a more effective indictor of radio listening, radio station selection and record album

purchasing than was the traditionally used segmentation variable of the sex demographic. Consequently, the format procedures were demonstrated as superior to the traditional demographic method, and the format procedures were roughly equivalent between themselves.

Due to the high agreement between the rank ordered and paired comparison format methods, the paired comparison method, while not superior to the rank ordered method in terms of the presented hypotheses, in most cases is equivalent. This suggests that situations in which one method can be used the other is applicable as well for designating audience format segments. While the geometric method was not shown to be superior for actually segmenting the audience in contrast to the rank order procedure, this fact must be interpreted in the context of the goals of this study and of the characteristics of the methods used. As mentioned earlier, one aspect of this study is to assess the application of the geometric method to format preference segments because the geometric methods provide the opportunity for refined measurement and further theoretical development based on the mathematical reference system generated from the data. Although one goal of the study was not met, that is the direct contrast of one segmentation method with the other, the other goal of investigating the applicability of geometric methods to the radio formats was met through demonstrating equivalence of two methods. This suggests that the range of mathematical applications possible with the geometric methods are applicable and that geometric methods warrant further exploratory analyses.

The final section of this chapter presented a series of exploratory analyses on the paired comparison differences of these respondents and of the dimensional structures of the calculated spatial configuration. These analyses suggested that the multidimensional methods are well suited for indicating format preferences, and identification of station formats. A most notable exploratory finding was that in the multidimensional data the rank ordering of the format concepts away from the self concept matched the decreasing size of the membership for that format segment. Thus, the mean difference between a set of formats from the self serves as an aggregate indicator of group membership, in percentage terms out of the whole.

CHAPTER V

Conclusions and Recommendations

This chapter presents the conclusions and limitations of the present study, and a set of recommendations for future research. This study focused on the segmentation of a radio audience according to their format preferences among competing available musical formats in the commercial FM radio market according to a geometric procedure for assigning audience members to format categories. Specific hypotheses were tested to provide insight into the applicability of metric multidimensional methods for radio audience research and to also examine the comparative advantages of using the geometric method of audience segment assignment for predicting car radio listening, radio station selections, and record album purchases.

Strengths and Limitations

In regard to the more general limitations, this study was a single market analysis, and radio is a very dynamic medium which may differ greatly from market to market. The traditional measurement techniques in use provide for very limited discriminations of the 5 point Likert scale. However, these limitations are not unique to this study, but are common throughout cognitive and behavioral research.

In regard to this particular study, it should be noted that this study was constrained to just one radio market; it was not a time series dynamic model of the audience; it was not comprehensive of all available formats or radio stations; that only students were included in the sample; that the sample was a special population with a very low representation of blacks and other racial and ethnic groups; and that the selected formats were a subset which cater to the specific 18-34 age category present in the sample. Each of these poses a limitation to the generalizability of the study. The concept labels in this study poses a limitation for the generalizability of the particular and specific findings into other audience segments as well as into other radio markets for two prominant reasons. First, as described in Chapter IV, the list of selected format labels is not inclusive of all possible format labels for the 18-34 age bracket and thus some audience tastes are not represented in the labels used and would remain undetected by the methodology and application used here. This set of labels was purposively limited to a total of five selections in order to allow a managable dissertation demonstrating metric multidimensional scaling applications. This then offers a tradeoff in the overall precision of audience measurement against the expense of research. The labels used for this student group were, however, the dominant descriptors identified through the pretest stages of this study. Hence, these findings are not immediately extensible either throughout the non-student 18-34 population nor beyond the until further research identified the preference vocabularies and stations listened to by other

target populations and then scales these labels in a comparable manner to the present study. Fortunately, geometric methods enhance this extensibility. Second, these labels are not extracted from the audience at large and are consequently uninformative as to the preferences and the audience segments arising from them in the non 18-34 age groups.

Another limitation of this study is that the format segments constructed by the rank order and the paired comparison methods had a very high degree of overlap, seriously reducing the ability to clearly test for differences between the two format assignment styles. These format groupings had a great degree of overlap, and if the preference ties in the paired comparison segments had not been allowed, the overlap may well have been much greater. While this suggests that neither method of segmenting the audience was superior to the other, it likewise suggests that the advanced methods of the geometric technique can be applied to radio format study and that the format segments generated by the geometric technique are not artifacts of the scaling procedure. Another way to look at this is that the geometric methods of paired comparison scaling provide nominal level segments as a matter of first level results, which suggests a reduced need for ranking type questions in research instrumentation. Further, this study demonstrates that the geometric method did provide a basis for linkage with external non-geometric variables based on the interrelationships among the geometric variables. See Figure 1.

FIGURE 1

Audience Segment Sizes by the Rank Order
and Paired Comparison Assignment Methods
Showing Degree of Overlap Between the Two
Methods

Legend: RO – Rank Order Segment

PC – Pair Comparison
Segment

OVL– Overlap Between
the Two Segments

| RO | PC | OVL | | RO | PC | OVL | | RO | PC | OVL |

. . . ROCK . . .   . . .TOP-40. . .   . UNCLASSIFIED. .
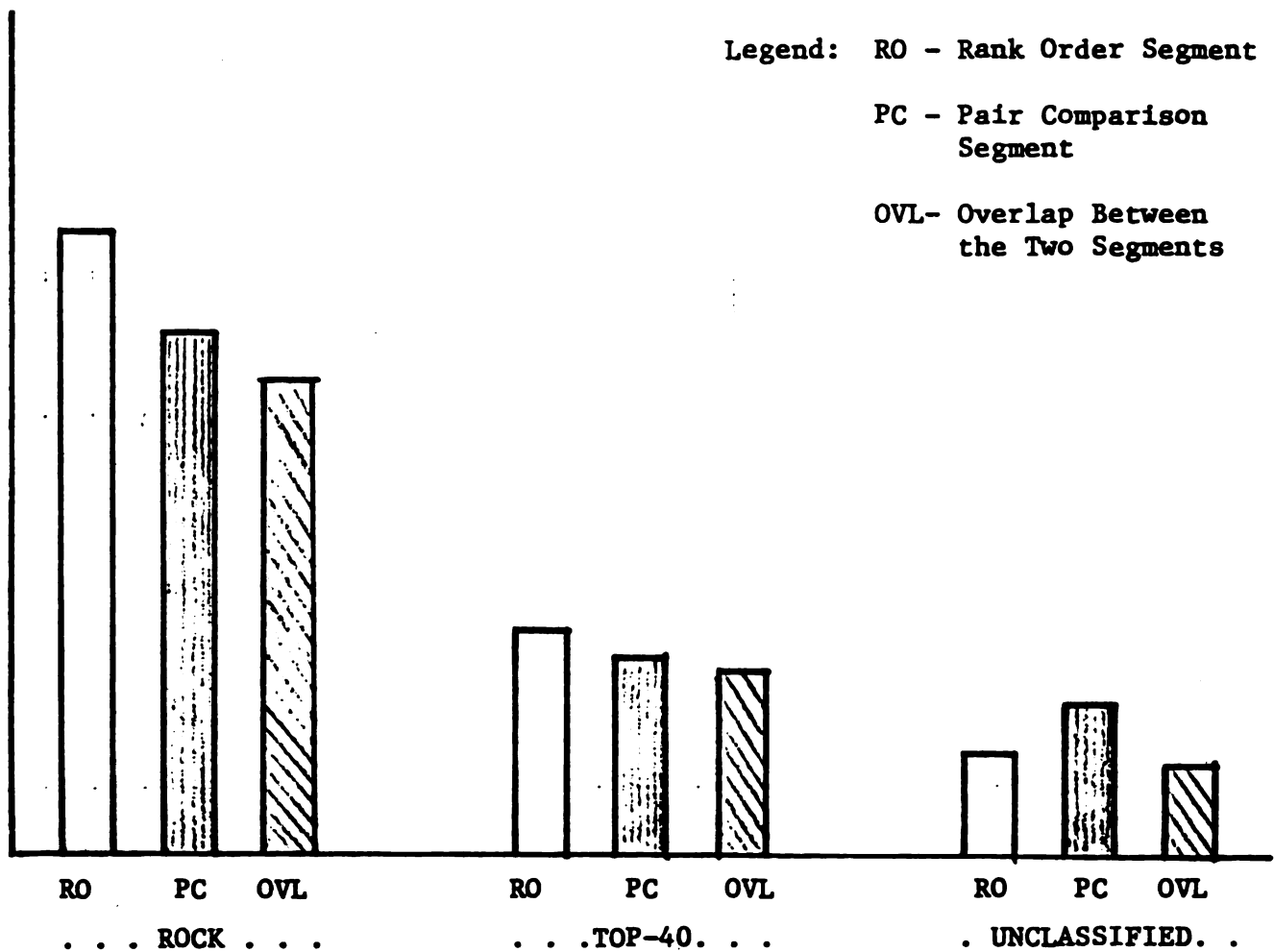
This geometric study suggests that format segments can be generated by geometric methods and that the segments generated by this procedure are not artifacts of the scaling procedure. The immediate applications of the current study suggest that the format descriptors used by industry are insufficient to discriminate between FM radio stations for purposes of academic audience research but by the use of musical descriptors such as those gathered in the exploratory interviews research can discriminate within the standard industry format categories. This finding allows for a more precise determination of the listening patterns within an audience. The extension of this is that the advanced measurement precision and theoretical and mathematical basis of geometric scaling methods used in other areas of aesthetic preferences can be extended to radio audience research. This method thus fosters research linking academic audience research with the vocabulary of industry.

For example, the technique of this study can serve in a market to identify the musical tastes and then serve to suggest programming strategies to reach the market. By identifying the radio audience in terms of the music they tune to rather than using standard industry classifications, the audience between stations can be identified and prototypic playlists can be developed to more carefully meet an audience preferences. The reason for this is based on the terminology used in a measurement instrument. In traditional radio research, the format concepts that are used to identify formats are not based on the language of the audience. Consequently, the audience is unable to respond to

survey prompts about their musical preferences in a manner informative to the researcher. As indicated by this study, similarly labelled industry station formats (e.g., adult contemporary) drew distinct audiences. Yet, the concept "adult contemporary" never appeared in the exploratory interviews. Hence, the audience could not provide informative answers to questions concerning radio format preferences as long as the descriptors used are unfamiliar. The present study derived the format and musical descriptors by exploratory interviews with typical audience members to ascertain the concepts that were used to describe musical and radio format preferences. In this manner, research instruments were designed to which the audience members could provide informative responses. This then provides a geometric mapping of musical format preferences against the FM stations and industry format labels and allows research to examine further audience discriminations of greater metric precision within the industry classifications. With judicious extension of controlled research, academic research findings can then be extended into the language of the practitioner community. This allows researchers to develop archetypal formats of industry categories as a stimulus for experimental research during experiences following which format and other aesthetic preferences can be measured. This would then allow the mathematical mapping of the subject audience preferences according to explicit industry designators and further encourage research where the stimulus programming is purposively manipulated in order to test for specifically hypothesized effects and audience behaviors ranging from optimal music and program feature mixes

(e.g., playlists) and audience receptivity for promotional messages, with all its political and marketing implications.

This suggests a research method which can identify format opportunities for a station by indicating the musical preferences of the audience that are not being met by the current program offerings can be constructed in such a manner that the audience itself can provide direct feedback as to their tastes and preferences. This allows the development of research projects to explicitly develop strategies based on direct, not inferred, audience preferences for market positioning, where a station programs music and other features in order to position itself strategically to the listening audience by offering a format mix that is optimum for those who are not dedicated listeners to any particular station.

Another industry application of these techniques is to aid advertisers in placement of commercials. With current industry format descriptions several stations in a single market may be formally designated the same was, e.g., as "adult contemporary." While these labels may serve as a rudimentary indicator of the radio audience from market to market, stations within a market as well as stations across markets may differ greatly in the music that they play and the audience characteristics that they attract. These methods are another step in the direction of discriminating among stations that are similarly labelled and identifying characteristics of formats across markets more precisely aiding advertisers in determining the degree to which an "album oriented rock" (AOR) station in one market is similar to a like

labelled format in another market and the degree to which the audience of one AOR station is similar to that of another AOR station.

The measurement methodology discussed in the present study must be examined as to the practical applications of the user communities who are to use the methods. The cost/benefits of the geometric methods at present are quite expensive for industry accounting functions, although these results are provided as a matter of course with the presented methods. Data costs are expensive for the geometric methods, with the size of some datasets hundreds of times as large as those needed for industry accounting procedures, and this entails greater costs for materiel and time. However, these methods do show promise for the sophisticated media buyer, marketer, and station manager for profiling specialty audiences, providing insight into the discriminations the audience makes between similarly programmed stations and provide a means to compare the programming in one market with that in another. Yet, for the academic researcher seeking theory development, these methods offer promise for developing refined measurement procedures which can detect underlying commonalities within the preferences and stations selections of the audience, as well as providing a mechanism for identifying audience segments according to their format preferences such that aesthetic preferences can be further studied.

The domains of adoption of these techniques is contingent upon the specific needs of the distinct user communities outlined earlier, whether they are academic or industry oriented. For the academic researcher, radio audiences have not received the same focus of

attention as television since the ascendency of network television; radio research has been minimal and perfunctory. For the academic researcher, these methods provide a mechanism for studying the format preferences and stations selections of the radio audience as aesthetic preferences in a geometric and mathematical framework which allows the incorporation of numerous allied variables of interest. This can contributed to a shifting in the criteria of acceptance of any technique in that the metric multidimensional techniques have been developed and primarily assessed in terms of their ability to provide academic researchers with an extremely precise measurement methodology for mapping the interrelationships among variables and concepts of interest. The present study extends these criteria into a linkage with other non-geometric variables and offers a way to extend these geometric analyses and map them into and along with the procedures currently in use by industry.

The heuristic value of this approach is in the varied applications that can be drawn from the geometric data. These applications range from the first level results of indicating audience segments by format preferences to second level analyses of the geometric structure of the preferences indicating the interrelationships among the format labels used. These results are then candidates to be entered into operations research models for designing formats to meet opportunities for modified formats in the market place. These data can also then be entered into computer simulations of audience selections and audience flow to contribute to strategic planning in the competitive radio market. While

at present these methods must be further developed according to the guidelines and needs of the academic researcher, they have clear implications for extension to the commercial users one they are developed and the primary research and development has been completed. The sophisticated commercial user, the programming consultant for example, can then enter the commercial field with advanced methods.

Conclusions

Several primary conclusions emerge from the preceding analyses, both in regard to format segmentation of the audience and in terms of the applicability of multidimensional methods to format segmentation of the radio audience. The generalizability of these conclusions must be kept in context of limitations of this research, as outlined in the previous section.

The primary conclusion of this research is that the audience can be geometrically segmented according to format preferences. The hypotheses tests indicated that format segmentation provided greater discrimination among stations selections, album purchases, and radio listening than did the traditional demographic indicator of sex. The conclusion to be drawn from this is that in regard to radio listening and musical preferences, indicators of musical formats provide useful indicators for further research. Format segmentation, in regard to radio audience analysis, was useful.

The second conclusion of this study is that the geometric paired comparison method of assigning format categories, on the whole, provides the rank order preference method of assigning format segments. In most cases, the results yielded by on method of format segmentation were matched by the results from the other method. While the geometric method did not demonstrate superiority over the rank ordered method for segment assignment, the geometric technique demonstrated utility to identify format segments according to the perceived interrelationships of the format descriptors. Thus, this conclusion is that the geometric assignment schema for format segmentation is useful and is entitled to further research extending these findings into an examination of perceptual mapping and relationships with other non-geometric variables which provides an opportunity to extend the mathematical richness of vector algebra and precise measurement into the domain of radio audience research. The need for rank order type questions for format preferences in research instruments is thus diminished.

The third conclusion of this study is that the selection of the self-concept descriptor in a multidimensional study is a critical decision, and one which must be made with care. As demonstrated by the present study, a behaviorally based self-activity concept of "my radio listening" was shown to be superior in every instance to the simple self reference of "myself." The implications of this finding are substantial in that many of the findings of the present study would not have emerged using the self reference, but were present with the behaviorally based self-concept. Conventional metric multidimensional scaling research has

not adopted the use of behaviorally based self-concept and this facet of study design could well mask potentially significant findings of research. The direct conclusion to be drawn from this is that although the metric multidimensional methods do appear very useful and hold promise for further research, the actual application of the technique is presently in need of further refinement, as indicated by the present research.

A fourth conclusion of this study is that the paired comparison measurement techniques used by metric multidimensional scaling serve well to discriminate among musical format labels and radio stations, particularly in conjunction with a behaviorally based self-concept. This allows a further discrimination among format preferences and audience segments than the industry based standard age- sex procedures. This may be extended to research to identify similarities and overlaps among the currently used industry format labels and provide for more distinct and informative radio format descriptors both across and within radio markets. Also, this conclusion suggests that with these geometric techniques, the audiences of simlarly labelled radio stations may be identified and discriminated at a level of precision much greater than current methods used industry wide.

A fifth conclusion is that the paired comparison measurements used by multidimensional scaling serve to provide an empirical link to other variables not scaled according to a geometric schema. This affords the opportunity to incorporate format and station preferences to an array of other variables of interest to the communication researcher and station

programmer. In particular, it was demonstrated that the paired comparison difference measurements used in this study in regard to radio listening, served as a predictor of minutes of radio listening. This finding provides a basis for linking the geometric and trigonometric findings of multidimensional analyses to other non-geometric behavioral indicators. From this conclusion we may infer that the paired comparison methods of radio audience concepts meet the initial conditions for multidimensional scaling analyses as discussed in Chapter Three.

A sixth conclusion is that the geometry necessary to recover the dimensional structure and geometric configuration of musical radio formats and radio station listening is both multidimensional and non-euclidean. Thus, dimensional methods that can map generally curved manifolds in Minkowski, Caley-Klein, and Riemann space are necessary to fully account for the perceptions of the radio audience. This is particularly the case when the set of scaled concepts cover several semantic domains, such as formats, stations, self-concepts, and judgemental attributes. From this, it is possible to extend the well developed marketing techniques of preference mapping and image studies into the domain of radio audience research, and thus develop new methods of "station positioning" and "station images" to explicitly targeted audience segments, based on a variety of discriminating attributes including musical preferences, social and political attitudes, product usage, and other preferences.

A seventh conclusion is that the multidimensional methods serve well as indicators of radio station format identification and listener format preferences. As indicated in the exploratory analyses, the mean differences provided a useful indicator for discriminating formats, stations, and preferences, particularly in regard to specific format segments in this audience sample. These exploratory analyses suggested that the mean differences among paired comparison concepts in the radio domain served to provide discriminations within the sample in regard to station and format identification that are useful for identifying the format preferences of the sample, the formats offered by the FM radio stations, and the relationships among them.

An eighth and final conclusion of this study is that the aggregate self-concept in a multidimensional study serves as an indicator of the sizes and relative membership of groupings in the sample. An intriguing finding of this research is that for the aggregate self-concept the format concepts were ranked in distance away from the self-concept in the same order as the decreasing size of the membership of the like-labeled format segment. That is, rock was closest to the self-concept, and rock was also the largest format segment. Top-40 was the next proximate concept to the aggergate self and it was also the second largest format segment, and so on for all the format groups in this study. An implication of this is that the geometric techniques may provide a initial method to identify the particular format preferences of social groups that are scaled into the space of concepts. An example of this would be to scale such concepts as the nuclear freeze movement,

political conservatives or the space industrialization movement into a most listened to by members of these groupings. This holds great potential for political advertising and the strategies of political action groups for identifying a sympathetic audience and then addressing them, as well as other broad research domains such as providing social science data for testimony in regard to the degree to which programming meets community needs, optimum musical channels for market development and new product diffusion, and the design of particular programming formats. This finding certainly merits further research.

Thus, in brief summary, these conclusions suggest that musical formats provide a useful way to segment the radio audience, that paired comparison geometric methods serve as equivalent indicators of radio format preferences and radio listening, particularly when a behaviorally based self-concept indicator is included, and that non-euclidean multidimensional methods are necessary for geometric analyses of the radio audience. These conclusions also suggest that multidimensional methods provide a most useful way for incorporating the complex inter-relationships involved in identifying musical preferences, the audience's perceptions of radio stations formats, and the stations and formats that the audience selects to attend.

Recommendations

Several recommendations are offered as a guide for future research into the applicability of multidimensional methods for audience segmentation research. The first set of recommendations concerns the use of repeated samples from other markets. It is recommended that this study, or one similar, be executed in markets other than the Lansing, Michigan area. Radio is a volitile medium and the format categories and station format styles in one radio market are not necessarily directly comparable with those in another media market. As described above, differences among industry format labels may not be informative as to the audience drawn to them due to the overlap of format categories and the inability of these labels to clearly discriminate the audiences between similarly labelled radio stations within a single market. Multidimensional methods are a useful tool for extending academic audience research into these other markets due to the ability of geometric methods for discriminating interrelationships among format concepts, radio stations, as well as other non-format and non-station variables of interest to the reseacher, such as political orientations and promotional susceptibility among audience segments within the audience at large.

While the particular format favorites and even the distinctions between formats may not be consistent from market to market, the multidimensional methods provide an ability to discriminate these differences and provide a comparative basis from market to market. Hence, specific research is suggested toward this end. Specific

research is needed to establish a minimum lexical set of symbols (or descriptors) that audience members use in describing their musical preferences and desired radio station attributes. This is essentially an extension of the exploratory interviews conducted for this dissertation which sought to identify musical preferences and radio station programming attributes. The goal of this research would be to provide a base of key concepts to be used in subsequent research and would foster the standardization of such research throughout the national commercial radio markets while providing data informative of the local market on a market by market basis. This suggestion is not meant to imply a national census but rather a simple procedure of identifying the vocabulary of the audience which contributes to academic audience research and conventionally reported such that the research user community may review these results.

A second recommendation for research concerns the continuing necessity to improve the reliability and discriminability of the measurement scales at our disposal. The paired comparison scales used in the current research provided useful indications of the variables under study, but the use of these scales revealed that great room for improvement exists for research using the method of complete paired comparisons. Immediate research is recommended to identify useful self-concepts and radio listening indicators by a comparative analysis of such self-concept indicators as "me," "myself," "my radio listening," "my FM radio listening," "my favorite format," "my favorite radio station," and "the radio station I listen to." Through an analyses of

these, and likely numerous other self-activity descriptors, radio audience research using multidimensional methods could potentially be dramatically improved by the selection of behaviorally based self-concept descriptors which can provide for reliable discriminations among other concepts in the multidimensional space. Those that are demonstrated to be the most useful (i.e., identified over most markets, known to most potential audience members, have minimum standard errors, easiest to incorporate into relationships with other musical and radio programming variables) can be adopted into research procedures which can be used across radio markets to provide some comparability in research results from market to market, as well as across stations within any particular market. The goal of this research would be to develop a research methodology that could be conventionally standardized to provide both audience measurements required by industry that would also allow the continuation of scientific research into the radio audience based on the same methods, similar variables, and similar constructs in order to promote a closer working relationship between the practitioner community and the research community.

The third recommended area of research is to apply multidimensional methods to develop and establish a set of musical format and performer reference concepts in the common language of the audience in order to aid future radio audience research. As conceived here, this would identify central musical figures and musical styles known throughout the nation according to the dominant format categories identified above. For example, a set of widely established format concepts (e.g., rock,

top-40, jazz) should be multidimensionally first scaled in a single area and then in a variety of radio markets in conjunction with a set of nationally known and established performers, whose recordings are a common part of radio play (e.g., the Rolling Stones, Frank Sinatra, Miles Davis). The interrelationships among these concepts would allow for comparative transformations and realignment of the data from one market to another. Such research would also afford the opportunity to identify components of radio formats across different markets that are commonly labeled but distinct in terms of the music that they refer to. In this manner, advertisers, in particular, would have some guidance in comparing say "rock" radio formats from market to market. A particularly attractive avenue of research is to incorporate the developed reference concepts into theoretical structures with other indicators of aesthetic preferences, such as with the complexity of the musical styles, rhythmic structures of the music, instrumental as compared with vocal music, atonal as compared with traditionally chordal musical structures, personality attributes of prototypic audience members, and sociological and psychological indicators of other aesthetic preferences. The goal of this research would be to uncover and articulate relationships among underlying attributes of musical preferences, musical structures, social indicators, personality factors, radio programming features, and radio station competition such that formats could be expressedly designed to attract those audience members whose preferences are not currently met by any of the audio programming sources in their radio environment.

A fourth recommended area of future research is to determine an optimum set of paired comparison concepts for indicating radio listening and record purchasing. This would refine the ability of paired comparison measurements to serve as empirical linkages to non-geometrically based variables and widen the scope and applicability of multidimensional audience research across wide domains of behavior (e.g., demonstrating in the streets, group singing, selection of live performances to attend) according to widely divergent musical styles (e.g., the musical preferences of the political right or left). The goal of this research would be to identify and develop attributes of musical socialization which are related to the many functions that have been attributed to radio, such as companionship, entertainment, and as a source of news.

A fifth recommended area of future research is to gather radio format and station preference data from a variety of samples from different traditional audience categories and assess the similarities of format perceptions across the different categories. This should include refined self-concept indicators and be directed to a refinement of the measurement device and its utility for cross-segment analysis. The goal of this research is to identify attributes of format preferences that are both similar and distinct from one social group and audience segment to another such that a more refined theory of audience preferences could be advanced.

A sixth recommended area for research is carefully design a field study to assess the effect noted in the exploratory analyses that in the multidimensional data the rank ordering of the format labels away from the aggregate self-concept served as an indicator of size of the membership of the various format segments. The goal of this research would be to further the development of the multidimensional methods for identifying groups within the audience that would be attracted to particular musical styles, thereby providing the station operator with an indicator for developing new program structures and musical format mixes by providing program material to a perceived audience that is not directly addressed by any other competing audio sources.

The seventh recommended area for future research is to execute research designed to incorporate the strengths of current market segmentation variables along with the multidimensional segmentation methods. That is, use the multidimensional methods to reveal discriminations within the male or female audience, or in another manner, to reveal commonalities between distinct audience segments, such as the teens and the 49 years old and older audience. Multidimensional methods have the capability for providing information on both effects. The goal of this research is to more fully incorporate and inter-relate the utility and precision geometric methods for indicating aesthetic preferences along with traditional market segmentation procedures to yield an amalgam of research techniques that can draw upon the relative advantages of each of the measurement techniques.

The eighth recommended area for research is to develop mathematical simulation models based on the multidimensional preference data for predicting format opportunities and program mixes unmet in the local radio environment. This would allow the development and theoretical testing of thematic program formats and features in light of audience preference prior to risking placing the new formats on the air. The goal of this research would be to establish indicators of audience draw and audience spill-over to other stations as a function of time of day and music aired and then enter these data into defined simulations to predict the likely audience resulting from program format modifications. This would then allow the development of a new style of competition by making the programming decisions of station personnel based on empirical data rather than intuitive judgements about the reasons for the audience size as reported in the previous syndicated market reports.

The ninth recommendation for future research is to extend the study of audience format preferences into the domain of advertising testing in terms of developing effective musical vehicles. for delivering promotional messages over commercial radio. The goal of this research would be to explicitly develop an understanding of the types of musical background that is effective as a commercial vehicle both as a function of the commercial content as well as a function of the audio environment in which the commercial will appear. In this manner, not only can radio target and program to a perceived audience, but the station programmer can also develop commercial style and placement strategies to optimize the advertiser's promotional efforts.

Summary

In brief summary, this study presented an analysis of radio audience format preferences according to their format preferences by using a multidimensional procedure for assessing audience segments. Both geometric and rank ordered measurement procedures were used. The geometric procedures were shown to provide results which closely identified the rank order format segments as a matter of first level analyses, and then provide for numerous research extensions as demonstrated through the hypotheses and exploratory findings as to linkages to radio listening, album purchases, and format preferences of the target audience of this study.

The advantages of this approach is that it provides a rigorous methodology for developing preference studies of the radio audience and the linkages of radio preferences and listening to other non-geometric type variables. While these methods are expensive from the perspective of the industry researcher, they are nonetheless informative for the academic researcher seeking to identify underlying characteristics of the preference patterns of the audience, their radio selections, and provides a heuristic method for generating data which can be subsequently entered into operations research and computer simulation models in that interrelationships are represented and the mathematical frame of reference can be extended, in the general case, across numerous and diverse radio audiences, programming styles, and markets.

APPENDIX

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 1

Thank you for participating in this radio audience study. The purpose of this research is to evaluate a range of items which have been found to contribute to our understanding of radio, radio programming and musical tastes. This questionnaire contains all the needed instructions and response sheets. Please fill out the questionnaire and then return it completed to 329 in the Com-Arts Building.

EXTRA CREDIT

Participation in this research is worth five (5) extra credit points. To earn the five points you must (1) complete the entire questionnaire; and (2) return it by next Wednesday at 5:00 PM to the box outside Office 329 in the Communications Arts and Sciences Building. If you are completing this questionnaire for extra credit, make absolutely sure that you put your name and student number on this page and complete the entire questionnaire. Work at your own pace, take your time. This is not a test -- it is a survey -- and your opinion will certainly count.

PARTICIPATION DATA (Needed only for extra credit participants)

NAME:

STUDENT NUMBER:

ADVERTISING CLASS NUMBER:

SECTION NUMBER:
(All items MUST be completed).

RETURN TO:
                        Office 329 Communications Arts and Sciences
                        Not later than WEDNESDAY at 5:00 PM

Thank You for your Participation --

Jamie

FILL OUT BOTH SIDES OF EACH SHEET

*** Please rank the following musical formats in order of your preference. Use the number 1 to indicate your first preference, number 2 for your second, and so on.

Classical	( )	Country-Western	( )
Easy-Listening	( )	Jazz	( )
Rock	( )	Top-40	( )

*** Some people listen to only one style of music and others listen to many different styles. Please indicate the percentage of the time that you listen to each of the following musical formats. Please be sure that your percentages total to 100%.

Classical	(%)	Country & Western	(%)
Easy Listening	(%)	Jazz	(%)
Rock	(%)	Top-40	(%)
Rhythm & Blues	(%)	Other	(%)

*** Using the following list of formats, please describe the dominant format, or musical style, of each of the following FM stations by writing in one of the following terms --

Formats:	Country-Western	Easy Listening	Rock	Muzak
	Classical	Jazz	Top-40	Other

Please write the format in the space provided:

WCMU-FM	( )	WFMK	( )
WILS-FM	( )	WVIC	( )
WITL	( )	WKAR-FM	( )
WLAV-FM	( )	WJIM-FM	( )
WJXQ	( )	WRIF	( )

*** Using the same format terms:

Which is your favorite radio _format_? (   )

Which _format_ do you like the least? (   )

Which FM radio station do you usually listen to at home? (   )

Which radio station do you usually listen to in the car? (   )

How many total MINUTES did you listen to the radio yesterday? (   )

How many MINUTES yesterday did you listen to the radio in a car? (   )

Which DAY of the WEEK is today? (   )

/

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 3
[Listening Diary]

*** Radio Listening Diary. These questions ask you to estimate the
number of MINUTES that you listened to different FM radio stations
YESTERDAY.   You are asked to distinguish between your radio listening
while at home or work and your radio listening while in a car. For each
part of the day listed, please write in the station(s) you listened to
and the number of minutes that you listened to each station.

Part of the Day	Radio Listening while at HOME or WORK		Radio Listening while in a CAR	
	Station(s)	Minutes	Station(s)	Minutes
6:00 AM to 10:00 AM				
10:00 AM to 3:00 PM				
3:00 PM to 7:00 PM				
7:00 PM to Midnight				
Midnight to 6:00 AM				

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 4
[Likerts]

*** Please use the following five-point scale to indicate the amount of
liking you have for each of the following formats and radio stations.

Item	Like a lot	Like a little	Neither	Dislike a little	Dislike a lot
WFMK (FM99)	1	2	3	4	5
WILS (101FM)	1	2	3	4	5
WVIC (95FM)	1	2	3	4	5
WJXQ (Q106)	1	2	3	4	5
WITL (100FM)	1	2	3	4	5
Classical	1	2	3	4	5
Jazz	1	2	3	4	5
Rock	1	2	3	4	5
Easy-Listening	1	2	3	4	5
Country-Western	1	2	3	4	5
New Wave	1	2	3	4	5
Punk	1	2	3	4	5
Progressive	1	2	3	4.	5
Top-40	1	2	3	4	5

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 5
[Descriptors]

*** Please indicate how much you agree that each of the following words describes yourself. Please circle the number which indicates your agreement with the descriptor word.

Are you . .	Agree a lot	Agree a little	Neither	Disagree a little	Disagree a lot
Affectionate	1	2	3	4	5
Amicable	1	2	3	4	5
Awkward	1	2	3	4	5
Brave	1	2	3	4	5
Broadminded	1	2	3	4	5
Creative	1	2	3	4	5
Dominating	1	2	3	4	5
Efficient	1	2	3	4	5
Egocentric	1	2	3	4	5
Frank	1	2	3	4	5
Funny	1	2	3	4	5
Intelligent	1	2	3	4	5
Kind	1	2	3	4	5
Refined	1	2	3	4	5
Reserved	1	2	3	4	5
Self-Assured	1	2	3	4	5
Sociable	1	2	3	4	5
Stubborn	1	2	3	4	5
Tense	1	2	3	4	5
Trustworthy	1	2	3	4	5

RADIO AUDIENCE STUDY (4/82: jwd)   ID: 6
[Buying Style]

*** Using the same five-point scale, how much would you say you agree with the following statements about yourself?

Statement	Agree a lot	Agree little	Neither	Disagree little	Disagree a lot
I always look for the name of the manufacturer on the package.	1	2	3	4	5
I do not buy unknown brands merely to save money.	1	2	3	4	5
I prefer to buy things my friends approve of.	1	2	3	4	5
All products that pollute the environment should be banned.	1	2	3	4	5
I shop around a lot to take advantage of specials or bargains.	1	2	3	4	5
I like to change brands often for the sake of variety and novelty.	1	2	3	4	5
When in the store, I often buy an item on the spur of the moment.	1	2	3	4	5
In general, advertising presents a true picture of the products of well known companies.	1	2	3	4	5
I generally plan far ahead to buy expensive items such as automobiles.	1	2	3	4	5
I try to keep abreast of changes in styles and fashions.	1	2	3	4	5

<u>RADIO AUDIENCE STUDY</u> <u>(4/82:jwd)</u>   ID: 7
[Demographics]

We would like to ask you several demographic questions so we can make a profile of the people who took part in this study. All responses are anonymous and confidential. Please circle where appropriate.

What is your AGE? _____   What is your SEX?   M   F

What is your RELIGION?   What is your RACE?

   (1)   Roman Catholic   (1)   American Indian

   (2)   Born-again Christian   (2)   Black

   (3)   Jewish   (3)   Caucasian

   (4)   Moslem   (4)   Latino

   (5)   Protestant   (5)   Oriental

   (6) None   (6)   Other (specify)

   (7)   Other (specify)

What is your CLASS in school?   Are you MARRIED?   Y   N

   (1) Freshman   (4) Senior

   (2) Sophmore   (5) Graduate Student

   (3) Junior   (6) Other

Where do you LIVE?

   (1) Dorm   (4) Fraternity/Sorority House

   (2) Apartment (5) Co-op

   (3) House   (6) Live with Parents or Guardian

Do you COMMUTE by CAR?   Y   N

Do you COMMUTE by BUS?   Y   N

How much spending money do you spend in an average week? $_____

What was your YEARLY INCOME for last year? $_____
What is your MAJOR?   _____

What is your GRADE POINT AVERAGE?   _____

The next several questions asks you to indicate your product purchases over the past year for two product categories.

Category I: Record Albums

Please indicate the number of record albums you purchased in the past 6 months for yourself or someone else. Write in the number of album purchases next to the appropriate musical format which describes your purchases. For example, if in the last 6 months you purchased 3 classical, 3 country-western, and 3 jazz albums for yourself, you would enter the number "3" for these categories.

Format	Total Albums Purchased in last 6 months	
	For Self	For Someone Else
Classical		
Country-Western		
Easy-Listening		
Jazz		
Rock		
Top-40		
Other		

Category II: Carbonated Soft Drinks

Please indicate which of the following carbonated soft drinks you use. Please estimate the number of 12 oz. servings of each of the following beverages you have had in the past month.

Carbonated Drink	Number of 12 oz. servings in past month
Coca-Cola	
Pepsi-Cola	
Tab	
Diet Pepsi	
Other (specify)	

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 9
[Product Purchases]

As you know, different styles of radio stations appeal to a wide variety of different tastes and preferences. This set of questions asks you to describe, according to your own opinion, how DIFFERENT two items are from each other. In order to do this, we will use a simple numerical scale. If, in your opinion, the two items are identical (that is you see NO DIFFERENCE between them) indicate this by writing down a ZERO "0" in the in the space provided. The greater the differences that you see between two items, the further you go up the scale. In other words, to report small differences, write small numbers; to report large differences write large numbers.

In order to have a common frame of reference let's use the following ruler:

The difference between RELAXING and EXCITING is 100

Please compare the difference between each item of the presented pairs with the above ruler. If the difference between two compared items is smaller than that between relaxing and exciting, then write a number less than 100; if this difference is greater than the difference between relaxing and exciting, then write a number greater than 100. Write any number (from zero on up) to report your opinion.

Let's try a set of these for practice. Now keeping in mind the above ruler, "the difference between relaxing and exciting is 100" compare each of the presented pairs to it and write down your response. Judge the differences in whatever manner you desire, just each time compare the presented pair with the ruler. Here we go --

The difference between RELAXING and EXCITING is 100

What is the DIFFERENCE between:

Walking . . . and . . . . Running	--> _____ (Answer Here)
Daydreaming . and . . . . Sleeping	--> _____
Radio . . . . and . Record Albums	--> _____
Radio . . . . and . . . Television	--> _____
Radio . . . . and . . . Commercials	--> _____
Commercials . and . . . Television	--> _____
Myself . . . and . . . . . . Radio	--> _____
Myself . . . and . . . Television	--> _____
Myself . . . and . . . Commercials	--> _____
Myself . . . and . . . Advertising	--> _____
Advertising . and . . . Commercials	--> _____
Radio . . . . and . . . Advertising	--> _____
Television . and . . . Advertising	--> _____
Cool Breeze . and . . . Warm Breeze	--> _____
Good . . . . and . . . . Bad	--> _____
Radio . . . . and . Riding in a Car	--> _____

That's the end of the practice pairs. Let's move on to questions about radio listening, music, and radio stations. Please consider each pair carefully. No need to rush.

<u>RADIO AUDIENCE STUDY</u> <u>(4/82:jwd)</u>   ID: 10
[MMDS]

      *Remember: The difference between RELAXING and EXCITING is 100

<u>What's</u> <u>the</u> <u>difference</u> <u>between</u>:

    Relaxing . . . . . and . . . . Informative --> ____ {answer}

    Entertaining . . . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . . . . . . Exciting --> ____

    Rock . . . . . . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . . . . Jazz --> ____

    Top-40 . . . . . and . . . . . Relaxing --> ____

    Relaxing . . . . and . . . Easy-Listening --> ____

    Country-Western . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . . . . Myself --> ____

    WILS (101FM) . . . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . . . . WFMK (FM99) --> ____

    WJXQ (Q106) . . . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . . . . WITL (FM100) --> ____

    WVIC (FM95) . . . and . . . . . . Relaxing --> ____

    Relaxing . . . . and . My Radio Listening --> ____

    Informative . . . and . . . . Entertaining --> ____

<u>What's</u> <u>the</u> <u>difference</u> <u>between</u>:

    Exciting   . . . and . . . . Informative --> ____

    Informative . . . and . . . . Rock --> ____

    Jazz . . . . . . and . . . . Informative --> ____

    Informative . . . and . . . . Top-40 --> ____

    Easy Listening . . and . . . . Informative --> ____

    Informative . . . and . . Country Western --> ____

    Myself   . . . . and . . . . Informative --> ____

    Informative . . . and . . . . WILS (101FM) --> ____

    WFMK (FM99) . . . and . . . . Informative --> ____

    Informative . . . and . . . . WJXQ (Q106) --> ____

    WITL (FM100) . . . and . . . . Informative --> ____

    Informative . . . and . . . . WVIC (FM95) --> ____

    My Radio Listening and . . . . Informative --> ____

    Entertaining . . . and . . . . . . Exciting --> ____

    Rock . . . . . . and . . . . Entertaining --> ____

    Entertaining . . . and . . . . Jazz --> ____

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 11
[MMDS]

   *Remember: The difference between RELAXING and EXCITING is 100

What's the difference between:

    Top-40 . . . . . . and . . . . Entertaining --> ____
    Entertaining . . . and . . . Easy Listening --> ____
    Country-Western . and . . . . Entertaining --> ____
    Entertaining . . . and . . . . Myself --> ____
    WILS (101FM) . . . and . . . . Entertaining --> ____
    Entertaining . . . and . . . . WFMK (FM99) --> ____
    WJXQ (Q106) . . . and . . . . Entertaining --> ____
    Entertaining . . . and . . . . WITL (FM100) --> ____
    WVIC (FM95) . . . and . . . . Entertaining --> ____
    Entertaining . . . and . My Radio Listening --> ____
    Exciting . . . . . and . . . . Rock --> ____
    Jazz . . . . and . . . . . . Exciting --> ____
    Exciting . . . . . and . . . . Top-40 --> ____
    Easy-Listening . . and . . . . . . Exciting --> ____
    Exciting . . . . . and . . Country-Western --> ____
    Myself . . . . . . and . . . . . . Exciting --> ____

What's the difference between:

    Exciting . . . . . and . . . . WILS (101FM) --> ____
    WFMK (FM99) . . . and . . . . . . Exciting --> ____
    Exciting . . . . . and . . . . WJXQ (Q106) --> ____
    WITL (FM100) . . . and . . . . . . Exciting --> ____
    Exciting . . . . . and . . . . WVIC (FM95) --> ____
    My Radio Listening and . . . . . . Exciting --> ____
    Rock . . . . and . . . . Jazz --> ____
    Top-40 . . . . . . and . . . . Rock --> ____
    Rock . . . . and . . . Easy-Listening --> ____
    Country-Western . and . . . . Rock --> ____
    Rock . . . . and . . . . Myself --> ____
    WILS (101FM) . . . and . . . . Rock --> ____
    Rock . . . . and . . . . WFMK (FM99) --> ____
    WJXQ (Q106) . . . and . . . . Rock --> ____
    Rock . . . . and . . . . WITL (FM100) --> ____
    WVIC (FM95) . . . and . . . . Rock --> ____

RADIO AUDIENCE STUDY (4/82:jwd)   .   ID: 12
[MADS]

     *Remember: The difference between RELAXING and EXCITING is 100

What's the difference between:

    Rock . . . . and . My Radio Listening --> ____

    Jazz . . . . and . . . . Top-40 --> ____

    Easy-Listening . . and . . . . Jazz --> ____

    Jazz . . . . and . . Country-Western --> ____

    Myself . . . . . . and . . . . Jazz --> ____

    Jazz . . . . and . . . . WILS (101FM) --> ____

    WFMK (FM99) . . . and . . . . Jazz --> ____

    Jazz . . . . and . . . . WJXQ (Q106) --> ____

    WITL (FM100) . . . and . . . . Jazz --> ____

    Jazz . . . . and . . . . WVIC (FM95) --> ____

    My Radio Listening and . . . . Jazz --> ____

    Top-40 . . . . . . and . . . Easy-Listening --> ____

    Country-Western . and . . . . Top-40 --> ____

    Top-40 . . . . . . and . . . . Myself --> ____

    WILS (101FM) . . . and . . . . Top-40 --> ____

    Top-40 . . . . . . and . . . . WFMK (FM99) --> ____

What's the difference between:

    WJXQ (Q106) . . . and . . . . Top-40 --> ____

    Top-40 . . . . . . and . . . . WITL (FM100) --> ____

    WVIC (FM95) . . . and . . . . Top-40 --> ____

    Top-40 . . . . . . and . My Radio Listening --> ____

    Easy-Listening . . and . . Country-Western --> ____

    Myself . . . . . . and . . . Easy-Listening --> ____

    Easy-Listening . . and . . . . WILS (101FM) --> ____

    WFMK (FM99) . . . and . . . Easy-Listening --> ____

    Easy-Listening . . and . . . . WJXQ (Q106) --> ____

    WITL (FM100) . . . and . . . Easy-Listening --> ____

    Easy-Listening . . and . . . . WVIC (FM95) --> ____

    My Radio Listening and . . . Easy-Listening --> ____

    Country-Western . and . . . . Myself --> ____

    WILS (101FM) . . . and . . Country-Western --> ____

    Country-Western . and . . . . WFMK (FM99) --> ____

    WJXQ (Q106) . . . and . . Country-Western --> ____

*Remember: The difference between RELAXING and EXCITING is 100

What's the difference between:

Country-Western . and . . . . WITL (FM100) --> ____

WVIC (FM95) . . . and . . Country-Western --> ____

Country-Western . and . My Radio Listening --> ____

Myself . . . . . . and . . . . WILS (101FM) --> ____

WFMK (FM99) . . . and . . . . Myself --> ____

Myself . . . . . . and . . . . WJXQ (Q106) --> ____

WITL (FM100) . . . and . . . . Myself --> ____

Myself . . . . . . and . . . . WVIC (FM95) --> ____

My Radio Listening and . . . . Myself --> ____

WILS (101FM) . . . and . . . . WFMK (FM99) --> ____

WJXQ (Q106) . . . and . . . . WILS (101FM) --> ____

WILS (101FM) . . . and . . . . WITL (FM100) --> ____

WVIC (FM95) · . . . and . . . . WILS (101FM) --> ____

WILS (101FM) . . . and . My Radio Listening --> ____

WFMK (FM99) . . . and . . . . WJXQ (Q106) --> ____

WITL (FM100) . . . and . . . . WFMK (FM99) --> ____

What's the difference between:

WFMK (FM99) . . . and . . . . WVIC (FM95) --> ____

My Radio Listening and . . . . WFMK (FM99) --> ____

WJXQ (Q106) . . . and . . . . WITL (FM100) --> ____

WVIC (FM95) . . . and . . . . WJXQ (Q106) --> ____

WJXQ (Q106) . . . and . My Radio Listening --> ____

WITL (FM100) . . . and . . . . WVIC (FM95) --> ____

My Radio Listening and . . . . WITL (FM100) --> ____

WVIC (95FM) . . . and . My Radio Listening --> ____

Myself . . . . . . and . . . . . My Radio Listening --> ____

Riding in a car . and . . . . . My Radio Listening --> ____

My Radio Listening and . The Nuclear-Freeze Movement --> ____

My Radio Listening and . . . The U.S. Space Program --> ____

My Radio Listening and . . . . Solar Power --> ____

Myself . . . . . . and . . . The U.S. Space Program --> ____

Myself . . . . . . and . The Nuclear-Freeze Movement --> ____

Myself . . . . . . and . . . . Solar Power --> ____

What's the difference between:

The U.S. Space Program . and . . . . Solar Power --> _____

The U.S. Space Program . and . The Nuclear-Freeze Movement --> ____

The Nuclear-Freeze Movement . and . . . . . . Solar Power --> _____

The Nuclear-Freeze Movement . and . . . . Television --> _____

The U.S. Space Program . and . . . . . . Television --> _____

Television . . . . and . . . . . . Solar Power --> _____

The U.S. Space Program . and . . . . . . Solar Power --> ____

This section presents a series of YES or NO questions. Please circle
the appropriate letter to indicate your response.

Do you have a telephone?	Y	N
Do you have a record player?	Y	N
Do you listen to the RADIO	Y	N
Do you watch TELEVISION	Y	N
Do you have a "walkman" type cassette tape player?	Y	N
Are you a video artist?	Y	N
Do you have a part-time job?	Y	N
Are you an only child?	Y	N
Do you receive financial aid?	Y	N
Are you smiling?	Y	N
Have you ever lived in a single parent household?	Y	N
Have you ever filled out a media usage survey before?	Y	N
Do you buy record albums?	Y	N
Do you drink Cola beverages?	Y	. N
Do you use any credit cards?	Y	N
Do you live alone?	Y	N
Can you program a computer?	Y	N
Are you a musician?	Y	N
Do you now or have you ever:		
Worked in broadcast radio?	Y	N
Worked in carrier current radio?	Y	N
Worked in broadcast television?	Y	N
Worked in cable television?	Y	N

RADIO AUDIENCE STUDY (4/82:jwd)   ID: 15
[Substances]

This set of questions ask you to indicate your rate of consumption of the following substances. Please indicate whether you ever use any of these substances on a daily, weekly, monthly or yearly basis.

	Never	Daily	Weekly	Monthly	Yearly
Beer	0	1	2	3	4
Coffee	0	1	2	3	4
Liquor	0	1	2	3	4
Marijuana	0	1	2	3	4
Tea	0	1	2	3	4
Tobacco	0	1	2	3	4
Wine	0	1	2	3	4

*** Please, in your own words, describe what the following terms mean to you:

Radio:

Television:

Jazz:

Rock:

Country-Western:

Top-40:

Classical:

Easy-Listening:

Solar Power:

The Nuclear-Freeze Movement:

The U.S. Space Program:

*** Suppose you owned your very own radio station and could do with it anything you pleased, what would you do?

Thank you for participating!

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