CHAPTER 11

TCRP
REPORT 95

TRANSIT COOPERATIVE
RESEARCH PROGRAM

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Transit Information and Promotion

Traveler Response to Transportation System Changes

TRANSPORTATION RESEARCH BOARD
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TRANSIT COOPERATIVE RESEARCH PROGRAM

TCRP REPORT 95

Traveler Response to Transportation System Changes

Chapter 11—Transit Information and Promotion

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TRANSIT COOPERATIVE RESEARCH PROGRAM

The nation's growth and the need to meet mobility, environmental, and energy objectives place demands on public transit systems. Current systems, some of which are old and in need of upgrading, must expand service area, increase service frequency, and improve efficiency to serve these demands. Research is necessary to solve operating problems, to adapt appropriate new technologies from other industries, and to introduce innovations into the transit industry. The Transit Cooperative Research Program (TCRP) serves as one of the principal means by which the transit industry can develop innovative near-term solutions to meet demands placed on it.

The need for TCRP was originally identified in *TRB Special Report 213—Research for Public Transit: New Directions*, published in 1987 and based on a study sponsored by the Urban Mass Transportation Administration—now the Federal Transit Administration (FTA). A report by the American Public Transportation Association (APTA), *Transportation 2000*, also recognized the need for local, problem-solving research. TCRP, modeled after the longstanding and successful National Cooperative Highway Research Program, undertakes research and other technical activities in response to the needs of transit service providers. The scope of TCRP includes a variety of transit research fields including planning, service configuration, equipment, facilities, operations, human resources, maintenance, policy, and administrative practices.

TCRP was established under FTA sponsorship in July 1992. Proposed by the U.S. Department of Transportation, TCRP was authorized as part of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). On May 13, 1992, a memorandum agreement outlining TCRP operating procedures was executed by the three cooperating organizations: FTA; the National Academies, acting through the Transportation Research Board (TRB); and the Transit Development Corporation, Inc. (TDC), a nonprofit educational and research organization established by APTA. TDC is responsible for forming the independent governing board, designated as the TCRP Oversight and Project Selection (TOPS) Committee.

Research problem statements for TCRP are solicited periodically but may be submitted to TRB by anyone at any time. It is the responsibility of the TOPS Committee to formulate the research program by identifying the highest priority projects. As part of the evaluation, the TOPS Committee defines funding levels and expected products.

Once selected, each project is assigned to an expert panel, appointed by the Transportation Research Board. The panels prepare project statements (requests for proposals), select contractors, and provide technical guidance and counsel throughout the life of the project. The process for developing research problem statements and selecting research agencies has been used by TRB in managing cooperative research programs since 1962. As in other TRB activities, TCRP project panels serve voluntarily without compensation.

Because research cannot have the desired impact if products fail to reach the intended audience, special emphasis is placed on disseminating TCRP results to the intended end users of the research: transit agencies, service providers, and suppliers. TRB provides a series of research reports, syntheses of transit practice, and other supporting material developed by TCRP research. APTA will arrange for workshops, training aids, field visits, and other activities to ensure that results are implemented by urban and rural transit industry practitioners.

The TCRP provides a forum where transit agencies can cooperatively address common operational problems. The TCRP results support and complement other ongoing transit research and training programs.

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NOTICE

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The members of the technical advisory panel selected to monitor this project and to review this report were chosen for recognized scholarly competence and with due consideration for the balance of disciplines appropriate to the project. The opinions and conclusions expressed or implied are those of the research agency that performed the research, and while they have been accepted as appropriate by the technical panel, they are not necessarily those of the Transportation Research Board, the National Research Council, the Transit Development Corporation, or the Federal Transit Administration of the U.S. Department of Transportation.

Each report is reviewed and accepted for publication by the technical panel according to procedures established and monitored by the Transportation Research Board Executive Committee and the Governing Board of the National Research Council.

Special Notice

The Transportation Research Board, the National Research Council, the Transit Development Corporation, and the Federal Transit Administration (sponsor of the Transit Cooperative Research Program) do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to the clarity and completeness of the project reporting.

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FOREWORD

By Stephan A. Parker
Staff Officer
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The traveler response to transit information and promotion varies widely, both in extent and duration of ridership gains. Results are influenced by the utility and quality of the transit service product being marketed, by external circumstances, and by the type of promotion. While all types of transit information and promotion activities may help raise awareness of public transportation services, increases in ridership are most likely to occur within specific populations as the result of targeted programs—especially individualized efforts designed on the basis of market research findings, delineating particular needs and opportunities.

A subset of transit marketing, namely transit information and promotion, is the focus of this chapter. Traveler response to mass market information, mass market promotions, targeted information, targeted promotions, customer information services, and real-time transit information dissemination are examined.

TCRP Report 95: Chapter 11, Transit Information and Promotion will be of interest to transit marketing staff and general managers, as well as strategic planners, educators, and researchers.

The overarching objective of the *Traveler Response to Transportation System Changes Handbook* is to equip members of the transportation profession with a comprehensive, readily accessible, interpretive documentation of results and experience obtained across the United States and elsewhere from (1) different types of transportation system changes and policy actions and (2) alternative land use and site development design approaches. While the focus is on contemporary observations and assessments of traveler responses as expressed in travel demand changes, the presentation is seasoned with earlier experiences and findings to identify trends or stability, and to fill information gaps that would otherwise exist. Comprehensive referencing of additional reference materials is provided to facilitate and encourage in-depth exploration of topics of interest. Travel demand and related impacts are expressed using such measures as usage of transportation facilities and services, before-and-after market shares and percentage changes, and elasticity.

The findings in the *Handbook* are intended to aid—as a general guide—in preliminary screening activities and quick turn-around assessments. The *Handbook* is not intended for use as a substitute for regional or project-specific travel demand evaluations and model applications, or other independent surveys and analyses.

The Second Edition of the handbook *Traveler Response to Transportation System Changes* was published by USDOT in July 1981, and it has been a valuable tool for transportation professionals, providing documentation of results from different types of transportation actions. This Third Edition of the *Handbook* covers 18 topic areas, including essentially all of the nine topic areas in the 1981 edition, modified slightly in

scope, plus nine new topic areas. Each topic is published as a chapter of *TCRP Report 95*. To access the chapters, select "TCRP, All Projects, B-12" from the TCRP website: http://www4.national-academies.org/trb/crp.nsf.

A team led by Richard H. Pratt, Consultant, Inc. is responsible for the *Traveler Response to Transportation System Changes Handbook, Third Edition*, through work conducted under TCRP Projects B-12, B-12A, and B-12B.

REPORT ORGANIZATION

The *Handbook*, organized for simultaneous print and electronic chapter-by-chapter publication, treats each chapter essentially as a stand-alone document. Each chapter includes text and self-contained references and sources on that topic. For example, the references cited in the text of Chapter 6, "Demand Responsive/ADA," refer to the Reference List at the end of that chapter. The *Handbook* user should, however, be conversant with the background and guidance provided in *TCRP Report 95: Chapter 1*, *Introduction*.

Upon completion of the *Report 95* series, the final Chapter 1 publication will include a CD-ROM of all 19 chapters. The complete outline of chapters is provided below.

Handbook Outline Showing Publication and Source-Data-Cutoff Dates

General Sections and Topic Area Chapters (TCRP Report 95 Nomenclature)	U.S. DOT Publication: First Edition	U.S. DOT Publication: Second Edition	TCRP Report 95: Source Data Cutoff Date	TCRP Report 95: Estimated Publication Date
Ch. 1 – Introduction (with Appendices A, B)	1977	1981	2003[a]	2000/03/04[a]
Multimodal/Intermodal Facilities				
Ch. 2 – HOV Facilities	1977	1981	1999	2000/04[b]
Ch. 3 – Park-and-Ride and Park-and-Pool	—	1981	2003[c]	2004[d]
Transit Facilities and Services				
Ch. 4 – Busways, BRT and Express Bus	1977[e]	1981	2003[c]	2004[d]
Ch. 5 – Vanpools and Buspools	1977	1981	1999	2000/04[b]
Ch. 6 – Demand Responsive/ADA	—	—	1999	2000/04[b]
Ch. 7 – Light Rail Transit	—	—	2003	2004[d]
Ch. 8 – Commuter Rail	—	—	2003	2004[d]
Public Transit Operations				
Ch. 9 – Transit Scheduling and Frequency	1977	1981	1999	2000/04[b]
Ch. 10 – Bus Routing and Coverage	1977	1981	1999	2000/04[b]
Ch. 11 – Transit Information and Promotion	1977	1981	2002	2003
Transportation Pricing				
Ch. 12 – Transit Pricing and Fares	1977	1981	1999	2000/04[b]
Ch. 13 – Parking Pricing and Fees	1977[e]	—	1999	2000/04[b]
Ch. 14 – Road Value Pricing	1977[e]	—	2002–03[f]	2003
Land Use and Non-Motorized Travel				
Ch. 15 – Land Use and Site Design	—	—	2001–02[f]	2003
Ch. 16 – Pedestrian and Bicycle Facilities	—	—	2003	2004[d]
Ch. 17 – Transit Oriented Design	—	—	2003[d]	2004[d]
Transportation Demand Management				
Ch. 18 – Parking Management and Supply	—	—	2000–02[f]	2003
Ch. 19 – Employer and Institutional TDM Strategies	1977[e]	1981[e]	2003	2004[d]

NOTES: [a] Published in TCRP Web Document 12, *Interim Handbook* (March 2000), without Appendix B. The "Interim Introduction" (2003) is a replacement. Publication of the final version of Chapter 1, "Introduction," as part of the TCRP Report 95 series, is anticipated for 2004.
[b] Published in TCRP Web Document 12, *Interim Handbook*, in March 2000. Available now at http://www4.nas.edu/trb/crp.nsf/All+Projects/TCRP+B-12. Publication as part of the TCRP Report 95 series is anticipated for the second half of 2004.
[c] The source data cutoff date for certain components of this chapter was 1999.
[d] Estimated.
[e] The edition in question addressed only certain aspects of later edition topical coverage.
[f] Primary cutoff was first year listed, but with selected information from second year listed.

CHAPTER 11 AUTHOR AND CONTRIBUTOR ACKNOWLEDGMENTS

TCRP Report 95, in essence the Third Edition of the "Traveler Response to Transportation System Changes" Handbook, is being prepared under Transit Cooperative Research Program Projects B12, B12A, and B12B by Richard H. Pratt, Consultant, Inc. in association with the Texas Transportation Institute; Jay Evans Consulting LLC; Parsons Brinckerhoff Quade & Douglas, Inc.; Cambridge Systematics, Inc.; J. Richard Kuzmyak, L.L.C.; SG Associates, Inc.; Gallop Corporation; McCollom Management Consulting, Inc.; Herbert S. Levinson, Transportation Consultant; and K.T. Analytics, Inc.

Richard H. Pratt is the Principal Investigator. Dr. Katherine F. Turnbull of the Texas Transportation Institute assisted as co-Principal Investigator during initial Project B12 phases, leading up to the Phase I Interim Report and the Phase II Draft Interim Handbook. Lead Handbook chapter authors and co-authors, in addition to Mr. Pratt, are John E. (Jay) Evans, IV, initially of Parsons Brinckerhoff and now of Jay Evans Consulting LLC; Dr. Turnbull; Frank Spielberg of SG Associates, Inc.; Brian E. McCollom of McCollom Management Consulting, Inc.; Erin Vaca of Cambridge Systematics, Inc.; J. Richard Kuzmyak, initially of Cambridge Systematics and now of J. Richard Kuzmyak, L.L.C.; and Dr. G. Bruce Douglas, Parsons Brinckerhoff Quade & Douglas, Inc. Contributing authors include Herbert S. Levinson, Transportation Consultant; Dr. Kiran U. Bhatt, K.T. Analytics, Inc.; Shawn M. Turner, Texas Transportation Institute; Dr. Rachel Weinberger, Cambridge Systematics and now of URS Corporation; and Dr. C. Y. Jeng, Gallop Corporation.

Other research agency team members contributing to the preparatory research, synthesis of information, and development of this Handbook have been Stephen Farnsworth, Laura Higgins, and Rachel Donovan of the Texas Transportation Institute; Nick Vlahos, Vicki Ruiter, and Karen Higgins of Cambridge Systematics, Inc.; Lydia Wong, Gordon Schultz, and Bill Davidson of Parsons Brinckerhoff Quade & Douglas, Inc.; and Laura C. (Peggy) Pratt of Richard H. Pratt, Consultant, Inc. As Principal Investigator, Mr. Pratt has participated iteratively and substantively in the development of each chapter. Dr. C. Y. Jeng of Gallop Corporation has provided pre-publication numerical quality control review. By special arrangement, Dr. Daniel B. Rathbone of The Urban Transportation Monitor searched past issues. Assistance in word processing, graphics and other essential support has been provided by Bonnie Duke and Pam Rowe of the Texas Transportation Institute; Karen Applegate, Laura Reseigh, and Stephen Bozik of Parsons Brinckerhoff; others too numerous to name but fully appreciated; and lastly the warmly remembered late Susan Spielberg of SG Associates.

Special thanks go to all involved for supporting the cooperative process adopted for topic area chapter development. Members of the TCRP Project B12/B12A/B12B Project Panel, named elsewhere, are providing review and comments for what will total over 20 individual publication documents/chapters. They have gone the extra mile in providing support on call including leads, reports, documentation, advice and direction over what will be the eight-year duration of the project. Four consecutive appointed or acting TCRP Senior Program Officers have given their support: Stephanie N. Robinson, who took the project through scope development and contract negotiation; Stephen J. Andrle, who led the work during the Project B-12 Phase and on into the TCRP B-12A Project Continuation; Harvey Berlin, who saw the Interim Handbook through to Website publication; and Stephan A. Parker, who is guiding the entire project to its complete fruition. The efforts of all are greatly appreciated.

Continued recognition is due to the participants in the development of the First and Second Editions, key elements of which are retained. Co-authors to Mr. Pratt were Neil J. Pedersen and Joseph J. Mather for the First Edition, and John N. Copple for the Second Edition. Crucial support and guidance for both editions was provided by the Federal Highway Administration's Technical Representative (COTR), Louise E. Skinner.

In the *TCRP Report 95* edition, Dr. Katherine F. Turnbull is lead author for this volume: Chapter 11, "Transit Information and Promotion." Contributing author for Chapter 11 is Richard H. Pratt.

Participation by the profession at large has been absolutely essential to the development of the Handbook and this chapter. Members of volunteer Review Groups, established for each chapter, reviewed outlines, provided leads, and in many cases undertook substantive reviews. Though all Review Group members who assisted are not listed here in the interests of brevity, their contribution is truly valued. Those who have undertaken reviews of Chapter 11 are George Gray and Rick Schreiner. In addition, Jon Bottom, Scott Bush, and Hannah Twaddell stepped in to provide needed chapter reviews.

Finally, sincere thanks are due to the many practitioners and researchers who were contacted for information and unstintingly supplied both that and all manner of statistics, data compilations and reports. Though not feasible to list here, many appear in the "References" section entries of this and other chapters.

CHAPTER 11—TRANSIT INFORMATION AND PROMOTION

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11—Transit Information and Promotion

OVERVIEW AND SUMMARY

A subset of transit marketing, namely transit information and promotion, is the focus of this chapter. Traveler response to mass market information, mass market promotions, targeted information, targeted promotions, customer information services, and real-time transit information dissemination is examined. This chapter does not address activities, at times characterized as marketing, that manifest themselves in introduction of new services, routing or schedule enhancements, or modified or special fares. These forms of transit service and pricing changes are covered in other chapters identified at the end of this introduction.

Included within this "Overview and Summary" section are the following:

"Objectives of Transit Information and Promotion" delineates goals and objectives for such efforts.

- "Types and Orientation of Transit Information and Promotion" categorizes and describes the characteristics of the various transit information and promotion activities.

- "Analytical Considerations" outlines the limitations of the available research, and the constraints thereby imposed on conclusions that may be drawn.

- "Traveler Response Summary" highlights this chapter's travel demand findings. It is strongly suggested that the first three sections of the "Overview and Summary" be read for context before undertaking use of either the summary or the material that follows.

Following the four-part "Overview and Summary" is the full presentation with citations:

- "Traveler Response by Type of Program" identifies individual applications within each program category and presents traveler response context, results and synthesis findings.

- "Underlying Traveler Response Factors" explores the parameters that affect the need for and influence the success of transit information and promotion activities.

- "Related Information and Impacts" presents special related subtopics including message awareness results, peak versus off-peak effects, and cost effectiveness.

- "Case Studies" expands on four illustrative examples of transit information and promotion activities.

While this chapter concentrates on transit information and promotion, broad definitions of transit marketing include consumer oriented planning and design of attractive services and

pricing of all types. For traveler response information on introduction or modification of multimodal and transit facilities and services, see Chapters 2 through 8. For bus transit operations improvements, see Chapter 9, "Transit Scheduling and Frequency," and Chapter 10, "Bus Routing and Coverage." For similar information on changes to the nature and amount of user costs, see Chapter 12, "Transit Pricing and Fares." Note that partnerships with employers and other major traffic generating entities, a marketing-intensive activity, are covered either in Chapter 10 or 12, depending on whether the primary focus is on service enhancements or discounted pricing.

Information and promotion activities as they relate to Travel Demand Management (TDM) are also touched upon in Chapter 19, "Individual Transportation Demand Strategies." Similar activities in support of walking and bicycling are covered in Chapter 16, "Pedestrian and Bicycle Facilities."

Objectives of Transit Information and Promotion

A primary goal of transit information and promotion activities is to increase ridership or net revenues, preferably both. While increasing ridership is the predominant goal of most transit information and promotion activities, efforts may also focus on objectives of:

- Retaining existing riders.
- Increasing frequency of use of current riders.
- Getting non-riders to try the system.
- Attracting new residents, and others with altered travel needs.
- Decreasing automobile use through mode shifts to transit.
- Increasing farebox revenues.
- Smoothing introduction of changes in fares, services or procedures.
- Encouraging rider shifts to more cost-effective services.
- Enhancing off-peak ridership.
- Attracting more riders faster to new services.
- Increasing rider and general public awareness of available service options.
- Improving the image of public transportation.
- Building support for specific initiatives or projects.
- Raising public awareness of transit service's social and economic benefits.
- Encouraging participation in related programs.

Informational and promotional efforts may be targeted toward specific transit modes, individual routes, and new services, or they may have a corridor, area, or region-wide orientation.

Types and Orientation of Transit Information and Promotion

The underlying marketing characteristics usually identified for a generic situation are product, place, price and promotion (the "four Ps"). In the case of transit, "product" and "place" are normally represented by "service" (Oram, 1987). This chapter focuses on "promotion" and subdivides it into transit information and transit promotion. Other chapters, listed above, focus on the all-important aspect of "product" (service) and price.

The focus of individual transit information and promotion activities will reflect the objectives of the specific programs. A variety of approaches and techniques can be used to inform the

public about the availability of transit services and to encourage use of those services. Print and electronic media — either via advertising or publicity, direct mailings, special events, free ride promotions, websites, telephone information numbers, and other approaches are all used separately and in combination.

The major categories of transit information and promotion efforts that have been undertaken and may be appropriate for consideration are identified below. These categories, which will be used to structure the presentation of traveler response findings, include mass market information, mass market promotion, targeted information, targeted promotion, ongoing customer information services, and real-time transit information dissemination. These categories are not mutually exclusive, as there is overlap among the various approaches.

Mass Market Information. Mass market information campaigns focus on providing general information about transit services and related programs to the population as a whole. These activities provide a basic level of information about the transit system and are intended to develop awareness of the various services available, and how to use them. Mass market information represents the most basic or general level of the transit information dissemination techniques. A variety of media may be used with mass market information campaigns, including newspaper, radio, television, billboards, direct mail, and special events. Supporting material and programs may include brochures, system maps, and ongoing customer information services including informative bus stop signs, telephone information systems, and websites.

Mass Market Promotions. Mass marketing promotions often take a further step by providing consumers with an extra incentive to try transit. Incentives may include free fares, reduced fares, discounts on merchandise or food, prizes, and contests. These extra incentives are intended to help entice individuals to try transit, with the hope that they will become regular riders. Mass market promotions may be tied with general marketing intended to raise the image of and build support for transit, and may use a range of advertising and promotional techniques. Provision of information may be a major or minor focus. Also included as a subset within mass market promotions is general marketing that takes place without either transit service information or incentives.

Targeted Information. This approach provides information on transit services, often specific services, to an individual market segment or segments. Transit information may be targeted toward residents in a certain area or along a specific route or corridor; employees at selected work locations or commuters in specific corridors; shoppers in general or in individual commercial areas; users of midday, evening, or late night transit; users of specific services; new residents; or other groups. Targeted information may be provided to specific market segments through direct mailings, take-one boxes, neighborhood newspapers, utility bills, paychecks, and other techniques. Supporting material and programs may include those used for mass market information plus route- or sector-specific maps and schedules.

Targeted Promotion. Like targeted information, this approach focuses transit promotions on a specific market segment or segments. Promotions such as free rides or other incentives are aimed only toward the desired group. The target groups may be much the same as for targeted information. A wide range of promotions, including free or discounted rides, merchant discounts, and other incentives, may be used to encourage individuals to try transit. Included as a subset of targeted promotion is one-on-one personal promotion, both personal sales and individualized marketing. Both targeted information and targeted promotion apply to new services as well as existing services.

Ongoing Customer Information Services. These services, available on a mostly continuous basis, are designed to provide individual members of the public with the information they need to use transit services in an area. Ongoing customer information provided by many transit agencies includes informative bus stop signs, telephone information services, Internet sites, community cable television, and other techniques. Telephone systems and Internet sites typically provide transit routing and schedule and fare information. Most telephone services and many Internet sites provide trip planning assistance — website transit trip planners that provide detailed itineraries based on user-selected criteria are becoming a major Internet site feature.

Real-Time Transit Information. Advanced Traveler Information Systems (ATIS) may provide real-time bus/train arrival time, travel time, alternate routings, or other transit information via changeable message signs, dedicated monitor or interactive computer displays, or websites. In addition, static or preferably real time transit information may be offered in conjunction with real-time road traffic and delay information. Automated vehicle location (AVL) systems and other advanced technologies provide the necessary real-time information on the status of transit vehicles. Changeable message signs may be used at transit stops and stations and on vehicles, and dedicated monitor and computer displays may be deployed at major transit stations, activity centers, workplaces, and other locations, while websites can be accessed by individuals at home or work.

In addition to these six categories, many transit agencies conduct a variety of internal activities and external public relations efforts that may be related to transit information and promotion. These may include internal programs oriented toward building employee moral and enhancing customer-oriented skills, press releases and media relations, education and outreach programs targeted toward schools, and other ongoing efforts. These types of programs are beyond the scope of this Handbook and this chapter.

Analytical Considerations

Available literature used to examine the travel behavior impacts of transit information and promotion has been supplemented with internal documents from selected transit agencies. Some literature reports both successes and failures, while other sources focus on successes only, a serious drawback to assessing success versus failure rates. Evaluating the influence of transit information and promotion activities is limited by this and a number of other factors, including the age of some of the most instructive evaluations. Unfortunately the distributions over time of available studies are not consistent from one marketing approach to another, affecting reliability of comparisons among approaches to some unknown degree.

There are relatively few published examinations of transit information and promotion programs that explicitly examine outcomes in terms of ridership effects. Many studies simply describe the promotion or marketing activity and not the impact. Others focus on general indicators, such as the reach of the message, or offer attitude and awareness survey results. When provided, changes in ridership are often expressed in overall measures, or couched in qualitative terms. Less information is available on the details of impact on travel behavior, especially the extent of long-term changes, and attraction of new riders to transit.

To some extent, the scarcity of monitoring and evaluation programs associated with transit information and promotion reflects the general difficulties associated with evaluating the effectiveness of any type of marketing activity. Comprehensive evaluations require a good consumer data base and tracking capabilities. These efforts are often overlooked or

underfunded at transit agencies. Further, it is difficult to measure the impact of general image and awareness marketing. The benefits of such an effort may be realized over a longer-term time frame, or in ways not measured in ridership.

It is also difficult to monitor, measure and take into account the impact of other system changes and external events that may be occurring at the same time as the transit information and promotion programs. Transit service and fare changes, increases or decreases in gasoline and parking costs, changes in the general economy of the area, and other factors may all influence travel behavior during a marketing effort. Most assessments either overlook entirely or are not able to track the impact of all these potential externalities.

Surveys of riders or participants may be included in program evaluation efforts. In many cases these surveys attempt to obtain information on respondents' actual or planned behavior. Care must be taken in interpreting results, as intended behavior is not always matched with actual outcomes. Further, individuals may respond with the behavior they think is desired by the sponsoring agency or organization, rather than their actual behavior or truly reasonable expectations. Surveys, especially those associated with use of free ride coupons or other incentives, may also suffer from self-selection biases. That is, individuals with a specific interest in a product or service offering — such as free rides or other benefits — may be more likely to respond than persons not predisposed toward transit use.

Additional evaluation and measurement issues to be alert to in any synthesis of findings are covered in Chapter 1, "Introduction," under "Use of The Handbook" — "Degree of Confidence Issues," "Impact Assessment Considerations," "Demographic Considerations" and "Concept of Elasticity." All of these various factors limit the conclusions that may be drawn concerning travel behavior effects of transit information and promotion programs, and call for extra caution in utilizing that data which is available.

Traveler Response Summary

The traveler response to transit information and promotion varies widely, both in extent and duration of ridership gains. Results are influenced by the utility and quality of the transit service product being marketed, by external circumstances, and by the type of promotion. While all types of transit information and promotion activities may help raise awareness of public transportation services, increases in ridership are most likely to occur within specific populations as the result of targeted programs, especially individualized efforts designed on the basis of market research findings, delineating particular needs and opportunities.

Mass-market information programs ranging from multimedia campaigns to door drops have proven effective in raising awareness for transit service support systems such as automated telephone information systems. In three instances reported, 26, 100 and 400 percent increases in information system use occurred after marketing. These types of mass-market informational or advertising activities typically have little impact on attracting significant numbers of *new* riders, and results in attracting more riding by *current* riders have been mixed. The highest total response reported, to distribution of a brochure covering bus service to 5 rural British towns, was a 12 percent ridership increase dropping to 3 percent after 4 months. An 11 percent increase, during a 6-month multifaceted campaign in an Idaho city, was also reported. Most mass-market effort results have been inconclusive.

Adding incentives such as free rides and give-aways to mass market campaigns normally heightens at least the short-term effect. Mass-market promotion activities with incentives, mostly Try Transit Week and special day type programs, have achieved 4 to 35 percent ridership increases — and probably more on small operations — during or immediately after promotions. Longer-term gains extending up to 3 years were reported in one case, but without certainty that the promotion was the cause.

General television, radio, and newspaper transit information and promotion efforts appear to have a near-term message recall most often in the range of 30 to 80 percent, with riders or potential riders having higher recall than the general public. In the case of mass market programs without either information or incentives, only one in four has been identified as increasing ridership, and then only by current riders.

Programs providing information targeted to specific groups, with or without promotion in the form of incentives, can generate new ridership — although the proportion relative to increased riding by current transit users remains small. First-time riders typically constitute 10 percent or less of the targeted marketing response. The specific groups involved may be people within the tributary area of an individual transit route or group of routes, or persons within other market delineations such as students or new residents. An increase of 1 to 3 percent in total riding appears to be about the minimum response, with effects ranging upward from there to 33 or even over 50 percent increases in the short-term.

Targeted promotions have been found by some researchers to have the greatest potential to increase ridership over both the short-term and the long-term. Information on the service and a free fare or other incentive appears to provide the combination of background needed to use the system and an economic reason to do so. Among the targeted projects included in the tabulations of this chapter, however, the general range and rough average of results (short-term ridership increases on the order of 10 percent) are virtually indistinguishable between information/promotion programs with incentives and without. The circumstances and project design and execution, including preparatory market research, appear to be the most important determinants by far. There is some extremely limited evidence that these gains may be maintained over longer time periods than the ridership increases during mass market free fare promotions.

The contribution of informational and promotional activities to the results of introducing new or modified transit service can, for the most part, only be surmised through examining the proportion of the population having knowledge of the change. Reported percentages of awareness after promotion range from 33 to over 95 percent. Even though evaluation difficulties prevent more definitive conclusions, promoting new services undoubtedly speeds ridership and revenue growth, which in itself can be the difference between early project success and termination. Approaches both with and without incentives seem to serve well in most instances.

The ultimate in targeted promotion is one-on-one personal contact. To date this has been almost exclusively the province of "individualized marketing" experiments and applications in Europe. In seven large-scale applications in Germany, increases in target group transit riding ranged from 10 to 30 percent, averaging 23 percent. Information from the earliest experiments shows the positive effect tapering off very slowly, with increases in mode share diminished by only 10 percent or so after 2 to 4 years. The increases were comprised of both more riding by current riders and riding by new patrons of transit, and were heavily concentrated among non-work travel purposes more oriented to off-peak transit use.

In addition to one-time or periodic efforts, transit systems continuously provide route, schedule, and fare information using techniques that may influence ridership. Telephone information systems are the established interactive approach. Telephone system automation with continually updated arrival times produced no discernable ridership impact in six reported cases, but was estimated to have increased ridership by 7 percent in one instance, and off-peak ridership by 8 percent in another. Use of Internet transit information websites has grown sharply since their introduction in 1994. In larger cities, 8 to 20 percent of transit riders visited transit websites in 2001. Websites appear successful in reaching younger and higher income rider segments and perhaps in reducing demand on telephone operators. In mid-2002, the San Francisco Bay Area website, with automated trip planning features, appeared to be handling about as many information requests as comparable telephone information systems.

The provision of real-time information on the status of transit vehicles through not only telephone systems but also changeable message signs and the Internet is another emerging trend. The limited experience to date indicates that these systems at a minimum help reduce the anxiety often associated with waiting for a bus or train. Available information on the influence of real-time information on increasing ridership is too fragmentary for effects to be generalized, as is the case for most other ongoing information resources.

The need for transit information and promotion programs is underlain by factors such as rider turnover and frequency of use. There is regular turnover among riders in response to changes in residential and employment locations, family situations, and other conditions. Many transit passengers are infrequent riders. These two factors point toward the need for regular ongoing transit information and promotion efforts.

The service level, orientation and transparency to the user of the scheduling and routing of transit services will influence the effectiveness of information and promotion activities. The best information and marketing programs cannot save a bad product or no product at all. Viable transit services must be available to the groups being targeted. Easy to understand routes and schedules help explain and promote themselves, and also make presentation of information easier and inherently more effective.

The cost effectiveness of different transit information and promotion programs has been estimated in a few instances. Most of the estimates cluster around a highly cost-effective 3/1 benefit/cost ratio. There is significant danger that less favorable benefit/cost ratios for promotion have simply not made their way into available reportings. Nevertheless, the risks of fielding a well-considered information or promotion campaign are low. Chances appear good that those efforts that don't entail too much transit agency "give-away" will at least break even if not actually produce net revenue gain from the added transit riding induced.

TRAVELER RESPONSE BY TYPE OF PROGRAM

Mass Market Information

Transit mass market information campaigns are characterized by a focus on providing general information to the population as a whole about some or all aspects of transit services and related programs systemwide. Table 11-1 highlights the few examples encountered of such campaigns where effects have been both evaluated and documented. More transit

information efforts are covered under the heading "Targeted Information," and under other categories to follow.

Table 11-1 Examples of Transit Mass Market Information Campaigns

Agency (Year)	Program	Cost	Impact
Multimedia			
Hamilton Street Railway (1990)	Promoted a new computerized telephone information "Bus Check" system in television commercials, telephone directory ads, and flyers.	$32,200 [a]	Daily calls to Bus Check rose from 3,000 to 6,000 in weeks following campaign. Of riders aware of Bus Check 69% learned of it through the promotion.
Door Drops			
COTA (Columbus, Ohio) (1980s)	"Door drop" of information on COTA's Teleride information system.	"Inexpensive"	Calls increased 400% after a door drop.
Transit Guides			
British Bus Companies (1970s)	Promoted bus service in and between 5 rural towns in a two-week saturation campaign. Color- coded brochures describing routes and transfer points were distributed on buses and through post offices, shops, libraries, and bus stations.	n/a	Two weeks after distribution 71% of all riders had a brochure, ridership increased by 12% after 4 weeks, but slipped to a 3% increase after 17 weeks. Transfer ticket sales increased 30% after 4 weeks, declining to a 10% increase after 17 weeks.
Multimedia and Transit Guides			
Port Authority of Allegheny County (1970)	Distributed 150,000 downtown Pittsburgh transit guides, in conjunction with a multimedia campaign promoting shopping trips by transit.	n/a	Mixed and inconclusive results in a time of civil disturbance. May underscore importance of having advertising messages in sync with the market's current issues.
Multifaceted Programs			
Three Idaho Transit Systems (1985 and 1986)	Program involved combination of new schedules, maps, vehicles, paint schemes, bus stop signs, radio and newspaper ads, and free bus passes.	n/a	Mixed results. Ridership and name recognition increased at two systems, while ridership declined at one due partly to reductions in service resulting from budget constraints.

Notes: [a] Canadian Dollars

Sources: Ontario Urban Transit Association (1994), Ellson and Tebb (1978), Port Authority of Allegheny County (1970), Cutler (1986).

The limited evidence available suggests positive results for mass market information campaigns when the product is not for some reason unattractive. It seems reasonable to infer that all of the reported campaigns followed a period of relative inactivity as far as proactive information dissemination is concerned, although this is not known with certainty. There is no basis for concluding what the extent of diminishing returns might be for repeating a campaign within whatever reasonable timeframe. Other nuances of the results, or lack thereof, are discussed below with reference to the specific efforts.

Introducing New Information Services

The first transit mass market information campaigns described in Table 11-1 were to introduce existing and potential transit patrons areawide in Hamilton, Ontario, and Columbus, Ohio, not to a new bus service, but rather to new ongoing automated telephone information services. Both would appear to have been successes, resulting in a doubling of "Bus Check" information service usage in Hamilton, and a 400 percent increase — immediately after an information "door drop" — in Columbus. Incentives may have been involved in Columbus (Ontario Urban Transit Association, 1994; Oram, 1987). In another instance, listed later in Table 11-11, addition of new features to the "Teleride" automated telephone information system in Calgary was promoted with a two month campaign, which included a wrapped bus, radio and newspaper advertisements, and other techniques. Calls to Teleride, which had been 6 million annually in 1994, increased by 26 percent during the 1995 promotion. A telephone survey in the last week of the campaign found the advertising reached 66 percent of the population (Texas Transportation Institute et al., 1999).

Transit Guide Distribution Campaigns

The two examples of transit guide distributions, in Great Britain and Pittsburgh, offer results ranging from apparently successful to questionable. The findings given in Table 11-1 for the British campaign provide both short-term results (12 percent more ridership and 30 percent more transfer ticket sales two weeks later) and long-term residuary effects (3 percent more ridership and 10 percent more transfer sales 17 weeks later). These outcomes were determined by comparison to control routes. Of distributed brochures, 6,600 were aimed primarily at existing riders through distribution on buses, and 5,000 were focused mostly on the general public by distribution at post offices, shops, libraries and bus stations (Ellson and Tebb, 1978).

Results of the downtown-focused campaign in Pittsburgh, where the brochures concentrated on illustrating location of downtown bus stops and shuttles, were mixed despite the presumed synergy of advertising the economy and social acceptability of shopping via transit. There are indications that this campaign was affected by circumstances, arising from social turmoil, that conflicted with the advertising message (Port Authority of Allegheny County, 1970). More background on this and other Pittsburgh information and promotion demonstrations is provided in the case study "Information and Promotional Campaign Demonstrations in Pittsburgh, Pennsylvania." The need to have a product perceived as attractive behind any marketing effort is addressed in the "Underlying Traveler Response Factors" section under "Service Quality — Actual and Perceived."

Multifaceted Programs

A more complex array of information and promotion programs, not all neatly fitting within the "Mass Market Information" category, was developed and implemented at three Idaho transit systems in 1985 and 1986. The transit systems were the Pocatello Urban Transit system, the Community and Rural Transportation (CART) system in Idaho Falls, and the TRANS IV system in Twin Falls. This Cooperative Transportation Marketing Demonstration Project was sponsored by the UMTA Service and Methods Demonstration Program and included a variety of market research, training, and promotion activities. Different transit information and promotion elements were used in each of the three communities, and the results were different.

In Pocatello, the marketing program included new schedules and maps, new vehicles and paint scheme, radio and newspaper advertisements, new bus stop signs, and free bus passes. At the same time, however, transit service hours and miles were reduced by 25 percent due to a budget shortfall. Presumably as a result, even with the promotional efforts, ridership declined by 20 percent during the time period. The financial problems also appeared to have adversely influenced general public opinion toward transit, although awareness of bus stop signs and information did increase.

Promotional activities in Idaho Falls included repainting vehicles with the new CART logo, public service announcements and radio ads, newspaper advertisements, and bus signs. Ridership increased slightly during the promotion, but this growth may have been influenced by new human services contracts. Public knowledge of the transit system name increased, and the general public perception toward transit was more positive. The Idaho Falls version of the demonstration marketing program fits more within the "Mass Market Promotions Without Incentives" category.

The marketing program in Twin Falls included new maps and schedules, new driver uniforms, new bus stop signs, public service announcements, and free tokens. The Pocatello and Twin Falls versions of the marketing program were multifaceted to the extent of containing both "Mass Market Information" and "Mass Market Promotions with Incentives" elements and more. Twin Falls ridership increased by 11 percent over the six-month period of the marketing effort. In addition, name recognition and awareness of the transit system increased (Cutler, 1986).

Mass Market Promotions

The effectiveness of mass market promotions in impacting travel behavior appears to greatly depend on whether an offer of free fares or some other type of incentive to try transit is included. Mass market promotions with incentives are addressed here first, followed by promotions without incentives.

Mass Market Promotions with Incentives

Mass market promotion examples with incentives are highlighted in Table 11-2. Increased ridership occurred during the promotional events in all but one reported case. These increases during specific areawide promotions ranged from 750 to 2,000 riders on small systems, and where percentages were reported, from 4 to 35 percent. While these increases

tend to be short lived, with ridership usually returning to pre-promotional levels, some areas have experienced slight long-term ridership gains.

Table 11-2. Examples of Transit Mass Market Promotions with Incentives

Agency (Year)	Program	Cost [a]	Impact
Special Days			
Oakville Transit (1987)	Promoted 15¢ fares for travel on Sept. 5, 1987, the 15th anniversary of system, by press releases and full-page newspaper ad.	$1,535 [b] including lost revenue	2,000 more riders than usual on that one Saturday. Suppliers paid for newspaper ad, got their logos displayed.
Sudbury Transit (1988)	Buttons given to riders and others for free ride after strike. Backed up with newspaper advertisements and other media.	$1,300 [b] including lost revenue	2,000 more riders on the free ride day, including some first time riders. Also generated good will at end of strike.
Metropolitan Transit System, San Diego (date n/a)	"Friends ride free" program offered on summer Sundays to boost weak Sunday riding.	n/a	Pilot program on Thanksgiving and Christmas produced revenue up 15% from previous year.
Try Transit Week/Day			
Marquette Co. Transit Authority (1996)	Utilized Letter to Editor from Board of Directors advertisement with free ride coupon.	$225 for ad.	Total of 750 coupons redeemed. Agency believed 75% were new riders.
Houston Metro (1997-ongoing)	Special $5 unlimited one-week pass promoted through radio, fliers, bus cards, decals, sales booths, employee salutes, etc.	Over $75,000 in 1997.	1997 - 3.8% increase in week's ridership over previous year. Of week's ridership, 7% identified as trial ridership of system.
Pembroke Transit (1984)	Multifaceted one week campaign of newspaper ads, special events, media coverage, a "two bits" (25¢) ride day, and free ride days for various rider categories.	$2,200 [b] direct & $3,000 [b] in lost revenue	Ridership was static in 1984. It increased 35% during the Transit Week, and 30% during following week. Ridership continued at higher level over next 3 years.
General Promotion			
Southeast Wisconsin (1997)	Phase 2 — TV, radio, and newspaper ads featuring Green Bay Packers promoted transit and a special $1.50 all-day pass.	n/a	Found 62% recall of ads in follow-up surveys. Short term 10% ridership gain, mostly from increased frequency of riding.

Notes: [a] Except where lost revenue is specifically identified, cost figures may or may not include revenues foregone.

[b] Canadian Dollars

Sources: Ontario Urban Transit Association (1988), Volinski (1997), Texas Transportation Institute et al. (1999), Northwest Research Group (1998), Bush (1998).

For example, Oakville Transit in the Canadian Province of Ontario celebrated its 15th anniversary on Saturday, September 5, 1987. Oakville Transit used the occasion to raise awareness of transit and to promote a positive image by offering a 15¢ fare that day. Press releases and a full page newspaper advertisement were used to promote the event. A celebration, featuring balloons and cake, was held in the downtown area. Approximately 2,000 more riders than usual rode the system on that Saturday. No long-term ridership gains were reported (Ontario Urban Transit Association, 1988).

The Southeast Wisconsin promotion, listed last in Table 11-2, was extensively documented. Both phases are covered in the case study "Transit Research and Marketing in Southeast Wisconsin." It was the second of two phases of promotion that included Green Bay Packers involvement and a ridership incentive: an all-day pass for $1.50. There was no significant change in the overall proportion of surveyed respondents riding transit after the second phase, but ridership did increase in the large 18 to 34 age group and the smaller 55 and over age group. Revenue ridership totals from the individual systems indicated a 10 percent increase in ridership region wide comparing June 1997 with June 1996, after ridership marketing between April 25 and May 15, 1997.

The study acknowledged difficulty in determining the influence of external factors, which included higher 1997 fares in Racine, April 1997 highway construction paired with temporarily increased bus service in Milwaukee and Waukesha, and unspecified local marketing efforts. Ridership in Kenosha, unaffected by fare changes or construction, was up 11 percent in June 1997, matching areawide results (Northwest Research Group, 1998; Bush, 1998). The Southeast Wisconsin Research and Marketing Initiative survey results, in combination with the ridership figures, imply that the apparently insignificant attraction of new riders was paired with a substantive increase in transit riding by existing riders.

Mass Market Promotions Without Incentives

In contrast to mass market promotions with incentives, and mass market informational campaigns, only one in four transit mass market promotions without incentives or an informational focus has been identified as demonstrating increased ridership or revenue. This is not to say that benefits have not been realized in ways not measured in ridership gains. Table 11-3 presents examples, and discussion of selected promotions follows.

In the first phase Southeast Wisconsin multimedia image campaign, entered in Table 11-3, newspaper and radio advertisements were used over a two-month period in the Fall of 1996 to promote a positive image of the four public transit systems involved. No transit use incentives were offered. The advertisements linked transit with other important community issues, including economic development and education. A tracking study, which included telephone interviews with 472 randomly selected individuals, obtained feedback on the reach and influence of the image campaign.

Half of those interviewed recalled the radio or newspaper advertisements. No major change in the awareness of specific transit services was noted by respondents. Improving transit continued to rank lower than other community issues, but there was a slight increase in the proportion rating it as an extremely important community issue. There was no significant change in the number of riders who had used transit in the past 30 days, but comparison with baseline surveys indicated increased frequency of usage for the sample population. The second phase promotion discussed earlier — and entered in Table 11-2 — was more effective

in increasing ridership, but the first phase image campaign had more influence on attitudes toward public transit (Northwest Research Group, 1998).

Table 11-3 Examples of Transit General Marketing Without Incentives

Agency (Year)	Program	Cost	Impact
Multimedia			
Southeast Wisconsin (1996)	Phase 1 — Newspaper and radio advertisements used to promote the image of four transit systems.	n/a	Follow-up surveys indicated 1/2 the respondents recalled the advertisements. There was a slight increase in the proportion rating transit as an extremely important community issue. There was no evidence of new ridership, but increased frequency of use was reported.
Television			
Ann Arbor Transportation Authority (1991-ongoing)	Cable Television.	$13,000	Surveys indicate 80% of riders and 60% of non-riders recall the advertisements.
Newspaper			
Stratford Transit (1988)	Newspaper ads and exterior bus signs promoting transit use.	n/a	No measurable increase in ridership.
Multifaceted Programs			
Port Authority of Allegheny County (1967-8)	Three campaigns: A. "Summer Fun" multi-media. B. Black-oriented media. C. McKeesport radio/newspaper.	A. — $47,000 B. $2,200 C. $3,700	Ridership declines from 1 to 8%. Followup surveys showed deterioration in perceptions due to external events (civil disorder, exact fare, talk of fare increases).

Sources: Northwest Research Group (1998), Texas Transportation Institute et al. (1999), Ontario Urban Transit Association (1988), Port Authority of Allegheny County (1970).

In Michigan, the Ann Arbor Transportation Authority (AATA) has — in a continuing program started in 1991 — run 30-second advertisements on a number of cable television stations throughout the year. The ads have also been run during all televised University of Michigan football and basketball games. Two new television spots are produced and aired approximately every 18 months, at a cost of some $13,000 and 56 hours of staff time per advertisement. The results from yearly onboard ridership surveys, and general telephone surveys conducted every 2 years, indicate that the advertisements are reaching passengers and non-riders. Some 80 percent of riders and 60 percent of the general public recalled the basic theme and message of the ads. No specific impact on ridership was measured (Texas Transportation Institute et al., 1999).

The downside end of the spectrum of documented general marketing campaign results is represented by the three Pittsburgh examples in Table 11-3. As indicated, the marketing efforts were accompanied by ridership declines of 1 to 8 percent. The marketing, part of a demonstration program, occurred at an unfortunate time of national and local civil disorders, exact fares introduction (cessation of change-making), and talk of a fare increase. These events are thought to have affected attitudes about the social acceptability and cost of riding transit that the advertisements could not overcome. Indeed, demonstration program evaluators surmised that a credibility gap may have been created as citizens viewed ads featuring good transit service when their own assessment was that things were deteriorating (Port Authority of Allegheny County, 1970).

Targeted Information

It appears to be a fairly universal finding, where it has been feasible to measure results, that targeting information to specific market groups generates additional ridership. The related tables and discussion that follow are differentiated according to whether the targeted information pertains to existing services ("Information Targeted by Market Segment") or is focused on service changes.

Information Targeted by Market Segment

The available examples of information targeted at current and potential users of existing services, summarized in Table 11-4 and in this section, indicate that targeting information to residents adjacent to specific routes or to university students consistently produces some degree of ridership increase. Unfortunately, much of the published information on the ridership increases is poorly specified, making it unclear in some instances what is really being compared against, and in other cases whether the growth pertains to the period of marketing, the period immediately after the marketing, or some longer time frame. A measured increase of 1 to 3 percent appears to be about the minimum response. Individual increases uninfluenced by special events (other than the marketing) have ranged as high as 33 percent or even more, probably during the marketing action or immediately thereafter. There is some very limited evidence that these gains may be maintained over longer time periods than the ridership increases during mass market free fare promotion.

A fairly recent example, the 1994-1995 direct mail marketing campaign by the Niagara Frontier Transportation Authority (Metro) in Buffalo, New York, involved a mailing to residents living within three-quarters of a mile of six bus routes. Some 20,640 residents received both information on the specific routes and a return postcard to request additional information. The mailing was further supported by advertisements inserted in publications distributed in the targeted zones. The targeted areas were selected on the basis of having significant percentages of individuals with lifestyles congruent with rider profiles from prior research. The cost of the flyers, ads, postage, and handling was approximately $10,000. Staff time on the promotion was estimated at 30 hours.

A comparison was made, during and for 4 weeks after the campaign, of farebox revenues on the targeted routes relative to the 4 weeks prior to the mailing. Revenues increased 1 to 3 percent on three routes, and 11 to 33 percent on three other routes, in this near-term time frame. In addition, 443 postcards were returned requesting additional information (Texas Transportation Institute et al., 1999).

Table 11-4 Examples of Information Targeted by Market Segment

Agency (Year)	Program	Cost	Impact
Targeted by Existing Route			
Santa Monica Municipal Bus Lines (1998)	Frequency on the Lincoln Blvd. bus route was upped from 20 to 10 min. intervals. The bus was identified by international travel advisories as the best way from LAX to downtown Santa Monica.	No info. dissem-ination cost for SMMBL	Service elasticity of about +0.97, higher than system average of +0.82. (See also Ch. 9, "Transit Scheduling and Frequency" — "Response by Type of Strategy" — "Bus Frequency Changes.")
Central Ohio Transit Authority (1996-ongoing)	Post Card mailing to residents within 1/4 mile of route serving OSU football games, with reminder of the high frequency service provided, and planting idea of taking bus to the games.	$21,500 (over half for added service)	In 1996, ridership increased by 17,357 (46%) and revenue increased by $17,078 (77%) over normal levels on the 6 football game Saturdays.
Niagara Frontier Trans. Authority (1994-1995)	Direct mail to 20,640 residents within 3/4 mile of 6 routes, describing route and providing mailback postcard for more information.	$10,000 and 30 hours of staff time.	1% to 3% revenue increase on 3 routes, and 11% to 33% on 3 routes, during promotion week and 4 weeks after. Received 443 requests for service information.
Port Authority of Allegheny County (1970)	Newspaper insert and on-request distribution of multicolor transit map and consolidated schedule for multi-route Penn Hills area service.	$7,600	Penn Hills ridership gains marginal in peak but 6% off-peak in short-term, 0.4% peak and 3.5% off- peak in longer term despite civil unrest.
University - Based			
Niagara Rapid Transit (1992-ongoing)	1,500 brochures distributed to Brock University students during orientation week.	n/a	Average shuttle ridership up from 40 passengers a day in 1992 to 70 passengers a day in 1993.

Sources: Catoe (1998), Texas Transportation Institute et al. (1999), Ontario Urban Transit Association (1994), Port Authority of Allegheny County (1970).

The 1970 Port Authority of Allegheny County information campaign targeted on the Penn Hills area of Pittsburgh remains of interest, among other reasons, because the analysis distinguished between peak and off-peak ridership. Practically all the ridership increase — as documented in Table 11-4 — occurred during the off-peak, with favorable net revenue implications as discussed further under "Related Information and Impacts" — "Effectiveness and Benefit/Cost Findings." Despite the modest overall ridership response, negatively impacted by civil unrest as described in the case study "Information and Promotional Campaign Demonstrations in Pittsburgh, Pennsylvania," project costs were recovered in 6 months through additional farebox revenues (Port Authority of Allegheny County, 1970).

Information Focused on Service Changes

The contribution of informational/promotional activities to the results of introducing new or modified transit services can, for the most part, only be surmised. Traveler responses to the promotion and to the service changes themselves are necessarily concurrent. Only when there are control routes or services not promoted, among the service changes, can a strong inference be made concerning impact of informing about or promoting new services. There is one such case, discussed under "Targeted Promotion," involving new St. Louis express bus routes. The likelihood of being able to establish study controls when initiating something like a new rail service is essentially nil.

It is nonetheless reasonable that a new transit service cannot attract users without dissemination, somehow, of information concerning the new service. Promoting new services thus undoubtedly speeds ridership and revenue growth, which in itself can be the difference between early project success or termination. Moreover, the promotion of favorable information may well induce more people to try the new service, and thereby afford added usage even after completion of initial service development. In contrast, a lack of information may result in exposure of potential riders to largely neutral or negative views of service changes.

Assessment of how well an informational/promotional campaign focused on new service has met its goals to inform the target population of service changes and encourage them to use it typically depends on such measures as the percentage of persons in the market recalling the campaign or adopting attitudes that were promoted. Table 11-5 provides case examples, with additional discussion following the table.

The Chicago Transit Authority (CTA) undertook a major marketing campaign upon reopening Green Line rail rapid transit service in 1996 after 2 years of complete closure for rehabilitation and upgrading. The Green Line serves the west and south sides of Chicago. The marketing effort was initiated prior to the reopening of the line and continued during the initial phase of reinstituted service. Promotional and informational elements included television and newspaper advertisements, newspaper stories, billboards, and information at Green Line train stations, other CTA train stations, inside CTA buses, and on CTA trains.

Marketing campaign effectiveness was evaluated primarily through a market area survey. After the campaign, 86 percent of the non-rider respondents knew about the Green Line, although for non-central business district (non-CBD) destinations, awareness was about 1/2 to 2/3 that amount. Of riders and non-riders, 39 and 30 percent, respectively, recalled a theme from the Green Line promotional campaign (Chicago Transit Authority, 1997). These mostly central city Chicago awareness percentages, while impressive, were less than achieved three decades earlier with a multi-media campaign introducing the Skokie Swift rail rapid transit extension to its primary suburban market area (see Table 11-5) – (Chicago Transit Authority and Planning Department, 1968).

Of Green Line riders recalling a marketing theme, 26 percent, or approximately 10 percent of all riders, indicated the advertisement positively influenced them to increase use of the line. Thirty-five percent said the ad did not increase their ridership, but did make them feel more positive about riding. Another 36 percent indicated the advertisement had no negative or positive impact. Overall, the ads had a positive influence on 61 percent of the riders recalling them, accounting for approximately 24 percent of Green Line riders.

Table 11-5 Examples of Information Targeted at Public Affected by Service Changes

Agency (Year)	Program	Cost	Impact
Rail Service Reintroduction			
Chicago Transit Authority (1996)	Major marketing campaign for reopening of Green Line rail rapid transit – TV and newspaper ads, billboards, and other media.	n/a	Campaign was successful in raising awareness, theme recall, and users claiming to have ridden the line more in response.
New Rail Service/Service Improvements			
Chicago Transit Authority (1964)	Promotion of opening of Skokie Swift rail rapid transit extension included press inspection trip, news articles, opening ceremonies, media advertising, and rider communication.	$70,000	Survey results indicated 96% of Skokie residents were able to identify the alliterative Skokie Swift name and 82% felt the new extension to be very important to residents.
Southeastern Pennsylvania Transportation Authority (1965)	Promotion of commuter rail improvements using media items, advertising, a movie and speaker's bureau, special events, personalized sales promotion, and publication.	$240,000	At start of project one-third of households in area knew of change, with awareness declining over time as fewer changes made. Newspaper articles were source of awareness for 60% of households.

Sources: Chicago Transit Authority (1997), Chicago Transit Authority and Planning Department (1968), Barrington and Company (1967), Southeastern Pennsylvania Transportation Authority (1969 and 1971).

Both riders and non-riders were asked a series of trade-off questions to identify factors that would encourage greater use of the Green Line. "Always getting to my destination on time" was rated most important by a large margin, while "if a schedule was mailed to my home" was rated least important (Chicago Transit Authority, 1997). The low standing of receiving a schedule or map at home does not necessarily conflict with positive findings for informational campaigns; it simply indicates a lower importance than basics like service reliability and saving time. More details on survey respondent recall of marketing themes, sources of information, trade-off analysis results, and customer attitudes and satisfaction are found in the case study "Green Line Reopening Marketing Campaign in Chicago."

An example of informing the public about major service changes — with information about decay in awareness over time — is provided by the 1965 promotion of commuter rail improvements in Philadelphia, described in the third entry of Table 11-5. With the help of the multi-media campaign, 1/3 of households in the service area knew about the improvements at the start of the project. Awareness dropped gradually to 7 percent as fewer and less dramatic changes were made. Awareness was higher for actual and potential users of the commuter rail service. For actual users, it started at 51 percent, decreasing to 10 percent, while for persons judged to be potential users, awareness started at 42 percent, decreasing to 4 percent (Barrington and Company, 1967; Southeastern Pennsylvania Transportation Authority, 1969 and 1971).

Targeted Promotion

Targeted promotions offer the combination of transit information (usually) and some type of incentive, typically free fares, providing individuals with the background necessary to ride transit and an economic reason to try it out. Targeted promotions in the United States and Canada have resulted in ridership increases of 2 to 50 percent. Only limited information is available on the use of free coupons by new versus existing riders, and on new rider retention over time. It does appear, however, that targeted promotions do attract new passengers to transit, some of whom continue to ride after the initial incentive.

Targeted promotions aimed at persons in the service area of particular transit routes or facilities are discussed here first, beginning with new routes and service changes, followed by existing routes and facilities. Then promotions targeted at particular consumer market groups are covered, followed by one-on-one promotion. One-on-one marketing activities — almost all European — have elicited the highest reported ridership response rates, ranging from 10 to 30 percent in large scale applications, and higher in tightly controlled test cases.

Promotion Focused on Service Changes

Table 11-6 lists examples of promotions, including incentives, specifically targeted at the public affected by transit service changes. This table is thus the companion of Table 11-5, which covers information without incentives, similarly targeted. Unfortunately, definitive comparisons are not possible. This is partly because the examples for information without incentives in Table 11-5 all happen to pertain to rail operations, while the examples for promotion with incentives in Table 11-6 pertain primarily to bus operations. It is also because the results information is so thin. Both approaches seem to serve well in most instances as an adjunct to introducing service changes.

The second St. Louis promotion of new express bus service listed in Table 11-6 is, despite the age of the data, of particular interest. This is because of the impact measurement against control routes. After the basic route development promotion listed in the first table entry, one suburban express route was selected for a major follow-up campaign. Display signs were placed on bus exteriors and at bus stops, large advertisements were run in two community newspapers, "Kelly Girls" were hired to visit homes in the service area, leaving promotional packets with one free ticket, and bus operators handed out packets to all regular customers. Immediately after the campaign and the period during which free tickets were valid, ridership increased 3.4 percent above the gain experienced by the entire group of new express routes. Some 3 months after the campaign the effect subsided, returning the route to its approximate pre-campaign position relative to the other express lines (W.C. Gilman and Co., 1966). Presumably the effect would have been greater had there not already been a full-scale introductory promotion (first entry in Table 11-6) preceding this experiment.

The Tri-County Metropolitan Transportation District of Oregon (Tri-Met) conducted a direct-mail campaign in the Parkrose neighborhood in early 1987, about 6 months after the opening of their Metropolitan Area Express (MAX) Light Rail Transit (LRT) line with stations nearby. Transit service changes had included restructuring of bus routes to provide feeder access to the LRT line and additional crosstown services. Some 15,700 households received packets including an advertising piece promoting transit for commuters, a map of bus routes in the neighborhood, peak-hour schedules for MAX and the local bus routes, and a mailback request good for a free two-week pass.

Table 11-6 Examples of Promotion Targeted at Public Affected by Service Changes

Agency (Year)	Program	Cost	Impact
New Express Bus Service			
St. Louis suburbs (1960s)	Free tickets along with schedules distributed to households within 1/2 mile of new express and crosstown routes. Media articles and advertising also used.	n/a	Survey showed 41% to 62% of service area residents to be familiar with new service.
St. Louis suburbs (1960s)	Subsequent, added promotion of one of the new express routes covered in the above described program. A major campaign, with 1 free ride ticket per packet.	n/a	Ridership increased 3.4% above gains on other new express routes right after free-ride period, returning to pre-campaign level of route growth after 3 months.
New Crosstown Bus Service			
Sacramento, CA (1969-1970)	Two separate mailings of complimentary passes in 1969 and 1970 to introduce a new cross-town bus line to service area residents.	n/a	Ridership increase (following the second mailing) 6 times the route average ridership increase and 4 times the increase in the same period the prior year.
Bus Routing Revised to Feed New LRT			
Tri-Met (Portland, OR) (1987)	Mailing of information packets to Parkrose neighborhood, focused on revised bus service and access to the new LRT, with mailback for free 2-week transit pass.	n/a	Of recipients, 27% responded to free pass offer. Of pass users, 10% were new to transit and 92% rode LRT at least once. Of new riders, 30% tried the bus.
Systemwide Improvements			
Five German Cities (1990s)	Full scale application of Individualized Marketing paralleled systemwide transit service improvements in 5 of 7 cities.	Est. 25 Deutsche Marks/ person	Targeted groups had over twice the ridership increase as control groups (see case study "Individualized Transit Marketing...").

Sources: W.C. Gilman and Co. (1966), Brogan and Heathington (1973), Pedersen (1989), UITP and Socialdata (1998).

A total of 4,300 households (27 percent) responded to the special pass offer. There was a self-administered survey of pass recipients, which obtained a 24 percent survey return. It indicated that of individuals using the free passes, 90 percent were existing riders, and 10 percent were new riders. Of pass recipients, 75 percent reported using the special pass personally, 2 percent gave it to someone else, and 23 percent ended up not using it. Reasons cited for not using the pass included too busy (44 percent), easier to use automobile (11 percent), and other factors such as being out of town or illness (44 percent).

Individuals receiving free passes were offered a 50 percent discount on a May pass if they joined the Pass-by-Mail program. Approximately 12 percent or 528 individuals signed up for this program, but only 3.5 percent or 153 continued in the program in June. The survey

results indicate that on the order of 20 percent of those requesting the half-price May pass may have been new riders. The low continuation rate into June suggested to the study author that this aspect of the campaign was not well focused on the Pass-by-Mail program (Pedersen, 1989).

The promotion had very limited success in increasing use of the feeder bus routes. Bus boarding counts at LRT stations showed no discernable pattern of higher bus ridership. The survey of special pass recipients identified a 2 percent increase in riding a bus to LRT among pass users, and 30 percent of new transit riders were induced to try the bus. Meanwhile, 92 percent of the pass-using respondents took at least one trip on MAX. That response was not quantified in terms of LRT ridership in the study. Only 20 percent rode the bus to reach LRT, 43 percent drove to a park-and-ride lot, 26 percent walked, 6 percent were dropped off, and 4 percent used other modes. Respondents who were prior Tri-Met riders were more likely to take the bus or walk than new riders, who tended to drive to a park-and-ride lot.

The free passes appear to have been used more heavily for off-peak trips than for peak-period commute trips. New riders used the pass for more shopping and more recreation trips than work purpose trips, and even prior Tri-Met riders used it for more shopping than work trips. It was speculated that these outcomes reflected interest in trying the relatively new LRT line among all groups, and the high number of retired people in the neighborhood. LRT use was aided by the information in the packets about how to access MAX, but in hindsight, it was thought that the promotion erred by focusing solely on commuting and in not providing off-peak schedules (Pedersen, 1989). Though the author highlights several disappointing outcomes, this project introduced at least some of the new transit services to hundreds if not a few thousand people.

Under similar circumstances of bus route revision in connection with new rail service, the San Mateo County Transit District on the San Francisco Peninsula chose to focus its marketing entirely on new residents of the target area, judging that they — lacking established commute arrangements — presented the best opportunity for attracting new riders (Texas Transportation Institute et al., 1999). This example is entered under "New Residents" in Table 11-8, in the "Promotion Targeted by Consumer Group" discussion.

Promotion Focused on Individual Existing Services

Examples of promotions including incentives, specifically targeted at the public within the service areas of existing transit services, are provided in Table 11-7. Selected entries are discussed following the table. Table 11-7 is the "with incentives" companion of the "Targeted by Existing Route" entries at the beginning of Table 11-4, which addresses targeted information "without incentives." The general range and rough average of results with incentives appears to be virtually indistinguishable, for information/promotion targeted on individual existing services, from the equivalent range and rough average of results without incentives.

The 1986 targeted transit information and free ride coupons dissemination by Tidewater Regional Transit (TRT) in Norfolk was designed as a research study to test mailing transit information with and without a coupon for a free ride to residents living within roughly four blocks. Half of the residents adjacent to two routes were sent only the transit information, while half received both the transit information and a free ride coupon. Along a third route, half the residents were given the transit information only, and half received nothing,

providing a small experimental control. The three routes had similar service frequencies, hours of service, ridership levels, and characteristics of riders.

Table 11-7 Examples of Promotions Targeted by Existing Transit Route or Facility

Agency (Year)	Program	Cost [a]	Impact
Targeted by Route or Corridor			
Greater Peoria Mass Transit District (1997-ongoing)	Packets delivered or left on doors at residences and businesses within 1 to 2 blocks of routes, with free bus ride ticket.	Approx-imately $2,000 per route	Ridership increases of 2% on targeted routes recorded for the month after distribution.
Tidewater Regional Transit (1986)	Direct mailing to selected Norfolk residents with transit information, alone or accompanied by a free ride coupon.	n/a	Of coupons, 909 (7%) redeemed. Coupon users were 94% existing riders, 6% new riders. Rider gain overall was perhaps 1.5%.
Metropolitan Transit Development Board (1995)	Direct mailing of service and safety information to San Diego area I-94 corridor residents with free round-trip ticket.	n/a	Redemption rate for the 20,000 coupons was 22%; 27,567 additional passengers in month of campaign; 5% ridership gain.
Hamilton Street Railway (1993)	Direct mailing to residents along routes with free ride coupon, newspaper ads.	Approx-imately $8,000 [b]	Ridership increased by 50% on one route during promotion, slight increases on others.
Niagara Transit (1980s)	Door-to-door delivery of packets with map and some free tickets.	n/a	Rider counts indicated no attri-butable increase in ridership.
Connecticut Transit (1980s)	Schedules and free-ride coupons sent to residences within 500 ft. of routes, newspaper ad backup.	n/a	Riding grew 25% on Hartford target route during test; phone information calls increased.
Metra (Chicago commuter RR) (mid 1990s)	Summertime travel guide offerings at downtown stations, discount coupons, and extension of family passes to weekdays.	n/a	One-way ticket sales up 10% 1993-95. Target group rider surveys suggested guides *influenced* 70%, coupons 82%.
Park-and-Ride Lot Market Area			
Regional Transit District (Denver) (1996-ongoing)	Direct mail to residents within 3 to 5 miles of under-utilized park-and-ride lots with five free-parking/free-ride coupons. Supported by radio/print ads.	$141,000 media & broad-cast pro-duction	Response rate to free-ride coupons was 11%. Ridership increased from targeted lots, as did calls to information center during the campaign.

Notes: [a] Except where cost categories are specifically identified, cost figures may or may not include the expense of free rides or other incentives.

[b] Canadian Dollars

Sources: Texas Transportation Institute et al. (1999), Capo and Messmer (1987), Elmore-Yalch (1998b), Ontario Urban Transit Association (1988 and 1994), Oram (1987), Volinski (1997).

A total of 29,155 brochures were mailed; 16,130 with information only and 13,025 with information and a free ride coupon. The coupons, good for all fare zones on the route, required that a short survey on the back be completed prior to use. Of the 909 coupons redeemed, 7 percent of the total mailed, approximately 22 percent were used the first week and 39 percent were used the second week of the 5-1/2 week eligibility period. More than 1/2 the coupons were used for off-peak trips. Riders using the coupons during the morning peak-period tended to be more frequent riders than those using them in the off-peak, and tended to use their coupons earlier on. Most coupon users (94 percent) were previous riders, most were transit dependent (only 30 percent typically had access to an automobile), and 52 percent reported incomes under $10,000.

Bus stop boarding counts differentiated by type of promotion showed some rational-looking outcomes, including ridership increases, higher in the month of the promotion than in the month following, and increases twice as large where free ride coupons were provided as compared to where only information was given out. These findings were thrown into substantial doubt, however, by two other findings: Firstly, the highest ridership gains by far were recorded on the control route segment where nothing had been done. Secondly, mathematical tests showed that the differences between the three types of circumstances (information alone, information plus coupon, control) were statistically insignificant; no significant increase in ridership could be demonstrated under either approach tested.

The study did find, based on analysis of 1,252 on-board survey returns obtained as part of the research, that 1.5 percent of those surveyed were "net new riders gained by information dissemination, a category applied to all new riders who reported receiving information." New riders overall totaled 9.6 percent. Some 24 percent of those boarding the information only route segments and 22 percent of those along the coupon route segments indicated an awareness of receiving the transit information. At the same time, 15 percent of riders on route segments where information was not distributed reported receiving information. The researchers concluded that the route-specific information and single free-ride coupons appeared to be ineffective in attracting new riders (Capo and Messmer, 1987).

In 1995, the Metropolitan Transit Development Board (MTDB) and the San Diego Association of Governments developed a targeted information and promotion program for transit services in the SR 94 corridor grounded in an extensive market research effort. Corridor transit ridership was lower than demographics would suggest, and research identified perceptions of safety as a key concern. A direct-mail packet was sent to 20,000 corridor households. Enclosed was a special ridership guide tailored to the SR 94 corridor that included maps and information on transit routes, schedules, park-and-ride locations, key destinations, and security measures employed. The packet also contained a free round trip ticket.

The redemption rate for the free tickets was 22 percent, higher than previous MTDB experience. An additional 27,567 passengers rode the corridor routes during the August promotion month relative to the year before, or 12,600 after deducting redeemed free-ride tickets. Overall, ridership on the promoted routes averaged practically a 5 percent increase, even with an average reduction in service hours of 2.4 percent (Elmore-Yalch, 1998b).

Promotion Targeted by Consumer Group

More examples of promotions including incentives, but this time targeted at consumer groups not necessarily within specific transit service areas, are tabulated in Table 11-8. These

examples do not provide enough specific response information to allow generalized conclusions, except that all the cited programs appear to have been beneficial.

Table 11-8 Examples of Promotions Targeted by Consumer Market Group

Agency (Year)	Program	Cost	Impact
New Residents			
San Mateo County Transit District (1997)	Direct mail to new residents in Northern San Mateo County, with 10 free one-way bus tickets, shortly after BART rail extension and bus route revisions.	$4 production cost per packet	Ridership increased by 11% on buses, and increases were noted at BART Colma Station. [Attribution of all this to the campaign may be open to some question.]
Chicago Transit Authority (1997-2000)	Direct mail to new residents in service area with two free rides, map, and rail station time table.	$15,000 per month [a]	Approximately 539,000 rides generated over the first 12 months.
Schools and Universities			
Palm Beach County Surface Transportation Department (1996-ongoing)	*Easy Rider* Student (grade and high school) Pass Program including a summer program using merchant coupons and game cards. Radio, television, and newspaper ads.	n/a	The first year of the promotion saw a 400 percent increase in student pass sales from the previous year.
Ames Transit Agency (1995)	Youth-oriented advertisements in Iowa State University newspaper emphasizing ease of bus use.	$1,200 per run	Recall of ads was 75% in focus group. Ridership increased 18% during 4 month campaign.
Senior Citizens			
Red Rose Transit Authority (Lancaster, PA) (1995-ongoing)	Annual frequent rider promotion for ages 65 and up. Game cards, punched for each ride, provide opportunities to win prizes.	$4,000+; prizes donated by mall.	Riding up during promotions. 1996 – 11,000 game cards; 47,000 rides in 6 weeks. 1997 – 7,500 cards; 30,000 rides in 5 weeks.
Off-Peak			
Brantford Transit (1988)	Two new malls ran newspaper ads promoting their openings and offering 3 free rides – 1 on a specific day, 1 on a specific route, and 1 good anytime.	Malls paid for ads and for free rides.	From 75,000 three-ticket sets distributed for shopper use, 33,750 rides were generated, probably mostly from existing riders.
Long Island RR (date n/a)	Promoted beach, sports, and in-city recreation travel with give-aways, discounts, special events.	n/a	$2.3 million growth in off-peak revenues during period.

Note: [a] $10,000 a month for contractor costs and $5,000 a month for redeemed $3.00 fare cards.

Sources: Texas Transportation Institute et al. (1999), Chicago Transit Authority (1999), Ontario Urban Transit Association (1988), Volinski (1997).

The targeted groups covered in the examples are new residents, schools, senior citizens, and potentially off-peak users of transit. This is not an all-inclusive list of consumer groups; others not infrequently targeted include tourists and commuters. Following the table, the Chicago Transit Authority "New Mover" program for new residents is examined in more detail. Finally, a case of targeted advertising without either information or incentives is discussed.

The Chicago Transit Authority (CTA) initiated a three-year marketing program in November 1997 targeted toward new residents and households moving within the service area. The Congestion Management and Air Quality (CMAQ) funded program's stated purpose was to introduce new residents to CTA service and to encourage former CTA passengers who had moved to continue riding at their new home. (Former CTA riders thus encouraged were classified in program evaluation as "retained riders.") Results and projections given here are based on the first 12 months.

The New Mover program employed monthly reports of new telephone numbers, listed and unlisted, to identify individuals moving into or within the CTA service area. A new resident information brochure and a questionnaire was sent to each identified household. Upon receipt of a completed questionnaire, CTA sent back a new resident kit including an automated fare card with two free rides, a CTA map, and a timetable for service at the nearest rail station. Some 123,421 initial mailings were sent to new/moved residents during the first year, ranging between 8,238 and 13,654 per month, and resulting in responses ranging between 916 and 4,820 per month. The overall response rate was 16.1 percent.

About 2,900 (14.6 percent) of the individuals responding to the initial mailing identified themselves as not currently riding CTA services but having the intention to become new riders given the free ride fare card. During the first 12 months, 36 percent of all new mover fare cards were renewed, including those given out to both new and previous riders. Use of the renewed fare cards was tracked for the following two months. It is not known to what extent recipients of the free ride cards may have purchased new cards as an alternative to or along with fare card renewal. The rides per week per renewed fare card during the two months after renewal averaged 6.7 rides, with 72 percent of the cards being used for less than 10 rides a week. This usage was assumed to reflect travel for more discretionary non-work purposes, with some occasional work trips, as compared to the presumed commuting use of the 28 percent of cards used for more than 10 rides per week.

The assessment made at the end of the initial 12 months also examined responses to the returned new mover questionnaires, making comparisons, where possible, with responses from the 1997 CTA Customer Satisfaction Survey (Chicago Transit Authority, 1999). A number of these comparisons are summarized in Table 11-9. Demographic information from the new mover respondents, in comparison with typical CTA rider characteristics, indicated that new mover household sizes were smaller than the average and that the age distribution was focused more on young adults. These comparisons may be seen in Table 11-9. Limited auto availability was presumed to be a factor in new mover interest in CTA, with 82 percent of respondents reporting no vehicle or only one vehicle available.

CTA trip frequency information from the new mover respondents showed, as reflected in Table 11-9, that the percentage who reported using service 6 or more times a week was consistent with CTA users overall, but that the percentages in the less frequent categories varied somewhat from the average. With regard to trip purposes for CTA travel a similar pattern emerged, with virtually the same work trip percentages reported, but with higher

percentages of shopping and social/entertainment trips emerging from the new mover questionnaire results. Nonetheless, the 4.2 days per week for CTA use as obtained from the CTA Customer Satisfaction Survey (Chicago Transit Authority, 1999) compares closely with what can be computed by applying reasonable assumptions to the new mover information.

Table 11-9 Household and Travel Characteristics of Chicago Area New Movers Versus Regular CTA Riders

Characteristic	New Movers Responding	CTA Rider Survey 1997
Household Size		
Single-person households	38%	26%
Two-person households	33	29
Larger households	29	45 [a]
Auto Availability		
No vehicle available	34%	30%
One vehicle available	48	(Question asked
More vehicles available	18	differently)
Age Distribution		
11-20 years of age	6%	26% (16-24 years)
21-30 years	50	41% (25-44 years)
31-40 years	22	(see above)
41-50 years	12	14% [a] (45-54 years)
51 and older	10	19% (55 up)
CTA Travel Frequency [b]		
6 or more times (days) per week	28%	27%
4 to 5 times per week	36	42
1 to 3 times per week	24	38
Less than 1 time per week	12	(sic)
Travel Purpose [b]		
Work	59%	58%
School	10	16
Shopping	10	7
Social and Entertainment	14	5
Medical and Other	7	14 [a]

Note: [a] Imputed by Handbook authors on the basis of subtraction.

[b] Anticipated in the instance of new movers who hadn't been using CTA, otherwise actual, as reported by respondents to the new resident kit mailings (or in the 1997 Customer Satisfaction Survey, the source of the CTA Rider comparison data in the last column).

Source: Chicago Transit Authority (1999).

Considering only impacts of new riders, a 3.3/1 benefit/cost ratio was estimated for the first year of the program, or 6.6/1 if both new and retained riders were included. The importance

of having attracted non-work, non-commute trips, which occur during off-peak periods, was noted. The New Mover program also appeared to be helping establish transit ridership patterns among younger adults, a good harbinger for future ridership. While acknowledging the desirability of examining new rider retention over longer time periods, CTA projected that cumulative new rider impacts of an ongoing campaign might, after 4 years, represent 2 to 3 percent of their average weekday ridership (Chicago Transit Authority, 1999).

The Ames (Iowa) Transit Agency advertising campaign in the Iowa State University student newspaper, also listed in Table 11-8, is an interesting case of promotion offering neither information nor incentives in that — without either — it reportedly achieved an 18 percent ridership increase during the four month campaign (amongst the targeted population, it may be presumed). The ads received sidebar placement on consecutive pages, featuring a colorful and lighthearted message about ease of using the bus. Focus group members had a 75 percent recall of the advertising, and many stated that the ads reinforced the value and ease of the bus service (Texas Transportation Institute et al., 1999). It may be that the small transit agency bus system in Ames offers a transparent simplicity requiring little additional in the way of information.

One-on-One Personal Promotion

The ultimate in targeted promotion is one-on-one personal contact. Experience with this approach is limited but suggestive of good potential. Table 11-10 provides a summary.

Telemarketing and Employee Transportation Days. Traveler response information has been encountered in two North American examples of either one-on-one personal promotion or a rough equivalent. One example is an instance of experimental telemarketing in Portland, Oregon. Reportedly 85 percent of the people contacted accepted transit information and free-ride coupons, with 20 percent of those actually using the coupons continuing to ride the bus (Oram, 1987).

The other example involves "Employee Transportation Day" activities, not exactly one-on-one, but having many of the same characteristics. An employment-site based program was initiated in 1990 in the Cross Westchester Expressway Corridor near White Plains, New York. Transit service improvements designed around employee travel patterns and needs were phased in, and Transportation Days were held at offices and workplaces to directly communicate travel options. These events were supported by a slide show presentation and script along with distribution of almost 3,000 "Customer Information Packages" in total. A sample of respondents to an initial 1990 survey were resurveyed in 1993 to assess outcomes. Employees who had attended a Transportation Day activity were found to have a solo driving mode share of 63.7 percent as compared to 70.8 percent for those who had not attended, even though both groups had almost identical solo driving rates in 1990 (68.6 versus 68.9 percent) (Spielberg et al., 1994). In interpreting this result, implications of possible "self selection" should be considered, to the extent that workers more interested in alternatives to driving may have been those who typically attended the informational events.

Individualized Transit Marketing. A series of trials in Europe involving individualized marketing have been conducted and extensively documented. The process of individualized screening, the categorization of those contacted into existing, potential and unlikely transit users, the provision of information to willing existing and potential users, and the personal

contact with potential users — often accompanied by a free pass — is more extensively described in the case study "Individualized Transit Marketing in Europe."[1]

Table 11-10 Examples of One-on-One Personal Promotion

Agency (Year)	Program	Cost	Impact
Telemarketing			
Tri-Met (Portland, OR) (date n/a)	Experimental telemarketing offering transit information and free-ride coupons.	n/a	Reportedly 85% of contacted persons accepted; 20% of those using the coupons kept riding.
Employee Transportation Day Activities			
Westchester County, NY (1990-1993)	Employee outreach through employee meetings with visual aids and information packets.	n/a	A 64% solo driving share for attendees versus 71% for non-attendees, starting from 69%.
Individualized Marketing			
Kassel, Germany (1991)	Experiment using consultancy staff for personal contacts, with tailored service information and a free monthly pass.	n/a	Transit use by participants overall doubled. Mode shares for 1st year up 85% for work trips to 141% for shop/services trips.
27 European cities (1990s)	Demonstrations using agency staff for personal or direct-mail contacts, offering service info and (in many cases) incentives.	n/a	Transit trips by *interested persons* up 24% on average. Face-to-face approach was almost twice as effective as direct mail.
7 German cities (1990s)	Full scale applications focusing on most promising individuals among persons contacted, making home visits with tailored information and free tickets.	Est. 25 Deutsche Marks/ person	Transit mode share of *all persons* not rejecting contact showed a 10%/20% increase attributable to marketing (cities without/with transit improvements).

Note: See also Table 11-11 for an example of Web-based transit trip planner applications.

Sources: Oram (1987), UITP and Socialdata (1998).

The initial individualized transit marketing tests were run in Kassel and Nürnberg, Germany, and then additional sites were added through large scale applications in Germany and cooperative demonstration programs throughout Europe. Data from the initial tests provide information on long-term effects, up to 4 years in the case of Kassel.

[1] As of publication of this chapter, individualized marketing results are newly available for non-European applications. South Perth and Brisbane, Australia, report target area public transport shares up 1/6 and 2/3, respectively, with walking/biking up sharply. (For walk/bike share specifics, see Chapter 16, "Pedestrian and Bicycle Facilities.") Both cities measured a 10 percent reduction in car trips in pilot studies, increasing to a 14 percent reduction in South Perth's subsequent large scale application, where response has been tracked for 2 years. Initial pilot area results from Portland, Oregon, suggest an 8 percent car travel reduction and a 27 percent "increase in travel by environmentally friendly modes" (Broeg, 2003; Federal Transit Administration, 2003).

Transit mode choice among the test group participants in Kassel more than doubled, from 8 to 17 percent 1 year after the individualized marketing was conducted. Use of transit by the test group participants continued to be strong 4 years after the test, with 16 percent of trips still using bus and tramway. The 115 percent first year growth in annual transit trips per person (92 before, 198 after) represented a 53 percent growth in the proportion of persons using transit on any given day (19 percent before, 29 percent after) and a 43 percent growth in frequency of transit use per day by the transit users (1.4 trips before, 2.0 after).

Overall, transit use by Kassel participants increased from 0.3 trips per day to 0.6 trips per day. The intensity of use by individuals who had already been using transit increased from 1.4 trips per public transport user to 2.0 trips. The total gain in transit rides derived from previous users was greater than the total gain from new users, however, this differential was less significant or non-existent in other tests and applications. First year mode shifts ranged from an 85 percent increase in work trip transit share up to a 141 percent increase in the transit share of shopping and services trips.

In Nürnberg, the changes were less pronounced but similar in pattern. The mode share among test group participants rose from 14 percent of trips via transit before the marketing to 23 percent after, an increase of 64 percent. After 2 years, 21 percent of trips were still being made by bus. A cost/benefit assessment indicated that the individualized marketing approach was cost-effective (UITP and Socialdata, 1998). Tabulations for Kassel and Nürnberg of the mode choice effects, and changes in transit travel by individual trip purposes, both over time and with control group data, are provided in the "Related Information and Impacts" section of this chapter under "Mode Shifts and Impact Decay" and "Peak Versus Off-Peak Ridership Effects," respectively.

The large-scale applications in Germany, which covered target populations averaging 35,000 households, produced smaller but not insubstantial ridership increases among the target populations willing to participate at least to the extent of answering questions. The share of ridership growth attributable to the individualized marketing was derived by using control groups to calculate a downward adjustment designed to discount effects of service improvements. Increases in the transit riding of participants attributable to the marketing ranged from 10 to 30 transit trips per person per annum, averaging 23 trips, a 15 percent increase over the "before" condition. Public satisfaction increased even more markedly.

In the pan-European demonstrations, an average transit mode share increase of 4 *percentage points* (roughly a 24 percent increase) was achieved among participants evaluated.[2] These demonstrations involved a wide variety of different applications techniques (UITP and Socialdata, 1998), and may be presumed to have been under the least influence of the developers of the original individualized marketing concept. Again, more information is provided in the "Individualized Transit Marketing in Europe" case study presentation.

Customer Information Services

The various types of transit rider information aids include system and route maps, bus stop and other signs, timetables, oral instructions including telephone information systems, and Internet websites. In this chapter, maps and timetables are treated as supporting materials to the informational and promotional campaigns addressed in the preceding subsections.

[2] "Percentage points" refers to an absolute difference in percentages, rather than a relative difference.

Oral instructions from bus drivers, fellow passengers and neighbors are acknowledged to be of major importance, but their effects don't lend themselves to isolation and quantification. Therefore this section on customer information services is limited to covering traveler response to bus stop signs, telephone information systems, and Internet websites.

Table 11-11 summarizes examples encountered where effects of bus stop signs and telephone information systems have been both evaluated and documented, and one case each where overall statistics are available for a large urban area telephone information service and for transit website use. After the table are more findings and coverage for both telephone information systems and websites.

Conventional Telephone Information Systems

Telephone information systems receive major emphasis at most transit agencies. A 1984 survey of marketing directors at 25 transit agencies found that 66 percent of marketing personnel were devoted to telephone information services. This result reflects the significant staffing levels needed to maintain telephone information systems. The same survey also found that the telephone information service at Seattle Metro accounted for 66 percent of the total marketing budget for the agency (Walb and Booth, 1985). There is little quantification available of the effect these services have on ridership, but an evaluation conducted by the Washington Metropolitan Area Transit Authority (WMATA) in 1983 provides a glimpse of the role played.

WMATA evaluated their conventional telephone information system — one of human operators aided by computer — on the basis of a telephone survey of information system users. Among 602 respondents, 82 percent reported actually taking the trip they had called about. Of those taking the transit trip in question, 67 percent stated they would not have done so without the information obtained. On this basis, assuming an average transit fare and no repeat travel, WMATA estimated their telephone information system brought in $520,000 in additional revenues, net of information system costs.

The WMATA survey also established that users of the telephone information system were not predominantly transit dependent, even though 80 percent did not have a car available at the time they called. Of respondents, 56 percent reported that some times during the day they did have a car available. Also, it may be inferred from the survey results that the telephone information system was of particular use to those planning off-peak trips, and helped develop off-peak riding. Whereas 37 percent of transit trips systemwide occurred in the off-peak, 56 percent of the transit trips made on the basis of a telephone inquiry were off-peak (Hall, Le Colletter and Yim, 1994).

The telephone information system in Los Angeles illustrates the scale of a large system. The system, implemented in 1977 by the Southern California Rapid Transit District and now operated by the Los Angeles County Metropolitan Transit Authority, uses a computerized database. It provides itinerary, schedule, and fare information covering 24 transit operations in the Los Angeles area. Automated delivery of itineraries through a synthesized voice was added in 1992. In 1993, 105 telephone operators handled an average of 12,000 daily or 4 million annual calls (Hall, Le Colletter and Yim, 1994). Information on research conducted in the Los Angeles area concerning public acceptance of synthesized voice information delivery versus direct human voice contact is reported in the "Underlying Traveler Response Factors" section under "User Processing and Application of Information."

Table 11-11 Examples of Signage, Telephone, and Website Customer Information Services

Agency (Year)	Program	Cost	Impact
Bus Stop Signs			
Milwaukee County Transit System (1970s)	New bus stop signs, designed using rider research, with route no., name and hours of service.	n/a	Of surveyed riders, 3% reported starting to use the bus as a result of the new bus stop signs.
Conventional Telephone Information Systems			
Washington Metropolitan Area Transit Auth. (ongoing)	Conventional telephone information system (human operators aided by computer) evaluated on basis of 1983 telephone survey.	n/a	Of callers, 82% took the transit trip inquired about; of these 67% stated they would not have used transit without the information.
L.A. County Metropolitan Transit Auth. (1977-ongoing)	Telephone information system for 24 Los Angeles area transit systems, computer aided with synthesized voice itinerary info.	n/a	Average daily usage in 1983 of 12,000 daily or 4 million annual calls for itinerary, schedule, and fare information.
Automated Telephone Information Systems			
Calgary Transit (1987-ongoing)	Implemented "Teleride" system providing information on next 2 or 3 buses at a specific stop. In 1995 added new menu accessing additional static information.	System cost n/a Promotion cost $76,500 [a]	Received 6 million calls in 1994. In 1995, during 2-month promotion of new features, usage was up 26%. No specific impacts on ridership were measured.
O-C Transpo, Ottawa (1980s-ongoing)	A unique phone number for each bus stop, and video displays at key locations, give next two bus arrival times and special alerts.	n/a	Calls totaled 700,000 monthly in mid-1990s. Awareness of system was 82%. System increased off-peak riding by an estimated 8%.
Internet Websites and Transit Trip Planners			
Metropolitan Transportation Commission (1994-ongoing)	Website for San Francisco Bay Area transit systems, including schedules and maps; 18-system trip planner added in July 2001.	n/a [b]	Average daily usage in July 2002 of 19,200 site visits with 5,400 trip itineraries provided (equivalent to 7 and 2 million annually).

Notes: [a] Canadian Dollars

[b] Website costs are not presently broken out. The total Regional Transit Information System (RTIS) development effort covering 25 bus, rail and ferry systems currently has a budget inclusive of operations and system development (inventory, data collection, infrastructure, GIS, software, web development, system testing) of approximately $1.6 million annually.

Sources: Dobies (1996); Hall, Le Colletter, and Yim (1994); Texas Transportation Institute et al. (1999); Parsons Brinckerhoff (1996); Urban Transportation Monitor (2002); Bay Area Transit Information (2002); Escudero (2002).

Automated Telephone Information Systems

Automated telephone information systems are coming into play. The "*560* system" in Ottawa-Carleton has for some time been a key component of O-C Transpo's customer information service. All stops and busway stations have an assigned telephone number with a 560 prefix. Individuals calling the numbers are provided with arrival times of the next two buses at the specific stop along with alerts about any delays or problems along the route. Large video monitors at major transit stations and shopping malls similarly provide upcoming bus arrival times. This information is particularly useful to customers during the Ontario winters, allowing them to stay out of the cold for extra minutes.

Approximately 700,000 inquiries *a month* (8.4 million annual equivalent) via the automated *560* telephone system were being recorded as of the mid-1990s. Most calls came during off-peak periods when intervals between buses are longer. One 1980's survey indicated that 82 percent of households in the region were aware of the system and 26 percent reported using it on a regular basis. A controlled statistical analysis of ridership changes in neighborhoods with the system versus those not yet having it provided an estimate that OC Transpo's *off-peak* ridership was enhanced by 8 percent thanks to the automated telephone information availability (Parsons Brinckerhoff, 1996). A clearly positive impact on ridership was also identified for the peak and evening periods (Hall, Le Colletter and Yim, 1994).

Similar "Telerider" systems have been implemented elsewhere. In the cases of Winnipeg, Mississauga, Kitchener and Guelph in Canada, in contrast to Ottawa-Carleton, no clear correlation could be established between Telerider system deployment and ridership levels. No significant ridership impact was identified in Salt Lake City or San Diego. In Columbus, however, routes with Telerider information available were identified as performing 7 percent better overall than control routes without Telerider (Hall, Le Colletter and Yim, 1994). This may have had something to do with promotion of Telerider in Columbus (see Columbus under "Mass Market Information" — "Introducing New Information Services").

Internet Websites

Most transit agencies have now implemented Internet websites. These websites usually contain information on routes, schedules, fares and special events, as well as information on employment and contracting opportunities, board actions, and other agency activities. Transit websites are used regularly by at least some rider segments and are apparently reducing reliance on more traditional sources of transit information, perhaps including telephone services. In addition, a number of transit agencies are starting to incorporate customized transit trip itinerary planning options and real-time information on the status of buses and trains. Web-based transit trip planners are covered in the fourth subsection of this websites discussion. Real-time features are mainly discussed in the following "Real-Time Transit Information Dissemination" section.

Website Growth, Market Penetration, and Usage. A 2001 survey of selected transit agencies found that among 34 responding agencies with websites, their sites had been first put in place anywhere between 1994 and 2001. The peak years of website initiation were 1995 through 1997, with 1/2 of the 34 sites in place part way into 1997 (Schaller, 2002). A total of 642 transit agency home pages were identified with links to the home page of the American Public Transit Association (now American Public Transportation Association – APTA) in 1999.

Transit website provision and use reflects the dramatic increase in Internet use nationwide. Household Internet access as tracked by the U.S. Census Bureau increased from 18 percent of households in 1997 to 26 percent in 1998 and 42 percent in 2000, or as measured by another survey, from 47 percent in mid-2000 to 56 percent at the end of that year. While the Census found 42 percent to be connected in 2000, 37 percent of households actually used it. Adding work access, 56 percent of adults went online in November/December 2000. In 2001, adding also access from all locations including schools, libraries and cyber cafés, 64 percent of U.S. adults went online.

Telephone surveys by transit agencies, thought to be more accurate than server log statistics, suggest that the level of Internet access capability for transit users mirrors national trends in several major cities, but falls well below national averages in other areas. Transit user Internet access percentages obtained in these surveys range from 60 to 70 percent in Chicago, Cleveland and New York down to 28 percent in Los Angeles. Among specific user groups, 80 percent of commuter rail riders in New York reported Internet access, 49 percent of "regular riders" (at least once a week) in Dallas had it, and 35 percent of Hispanic riders and 33 percent of senior riders in Orange County, California, reported access. Income and age do affect degree of Internet access. Of New York City Transit users, 85 percent of those with incomes over $50,000 report Internet access, versus 38 percent with incomes below $25,000, while 75 percent of age 18 to 34 report access, versus 27 percent of age 65 and above.

Although growth in Internet access nationwide reportedly leveled off in 2001, transit website usage growth continued apace. Reports from 29 agencies for mid-2000 through mid-2001 indicated site usage increases ranging from to 10 to 500 percent, with a median annual increase of 60 percent. The corresponding mean of 101 percent reflected very rapid growth for several sites. Information from nine transit agencies showed annual growth in site visits of 30 to 110 percent from November/December 2000 through the same months in 2001, despite recession and terrorism related reductions in tourism and travel. (Schaller, 2002).

Table 11-12 provides the results of transit agency telephone surveys both in terms of proportions of persons with Internet access and of actual usage rates for the individual transit websites. The percentage of riders in the mostly large metropolitan areas surveyed who had visited the transit website ranged from 8 to 20 percent. Roughly 1/4 of most agencies' transit riders who reported capability to access their transit website had done so. In the three cities where the information was available, it appears that about 1/2 of those who had visited their transit website made at least one visit during the previous 30 days.

Various limitations affecting website server log statistics render them inappropriate for use as "precise yardsticks of visitor activity" but they do provide overall patterns and trends not otherwise available. Server log statistics for 29 transit agencies surveyed in 2001 suggest that overall visitation rates that year were running at a shade under 300 sessions per month per 1,000 average weekday boardings (unlinked transit trips). Peak usage occurs during the business day, with 6 to 8 percent of total daily visitor sessions in any one hour. Nevertheless, at most transit websites, evening and weekend use is more than 1/2 the total.

The most-used transit website content was found to be schedules, maps and other service related information. "Internet users are predominantly looking for service-related information to help plan their trips." In an open-ended survey, 98 percent of agencies named schedules or timetables as the most popular pages, 61 percent named maps, and lesser percentages named trip planning, fares, bikes on transit, and ticket purchasing, along with functions not related to service information. Server logs confirm that schedules have almost

always been the most-used pages, with maps in second or third place. Other service-related pages receiving at least 1 percent of "hits" include fares, pass information, trip planners, and "how to ride" pages (Schaller, 2002).

Table 11-12 Internet Access and Site Visitation Rates Based on Telephone Surveys

Region – Agency	Survey Date	Survey Universe	Percent with Internet Access	Percent Having Visited Website	Percent Visiting in Last 30 Days
N.Y. – Long Island RR	4th Quarter 2000	Riders	80%	20%	n/a
N.Y. – Metro North RR	4th Quarter 2000	Riders	80	19	n/a
S.F. – BART	Dec. 99/Jan. 00	Riders	n/a	19	10%
Chicago – CTA	1999	Riders	70	16	7
N.Y. – NYCT	4th Quarter 2000	All Residents	65	14	8
Cleveland – RTA	2001	Used transit in past 2 yrs.	60	8	n/a
Dallas – DART	2000	Ride at least once/week	49	14	n/a

Note: These results cannot be assumed to be representative of conditions in smaller cities.

Source: Schaller (2002).

These findings mostly reflect website content with trip planning features either lacking or in a very early stage of implementation. A trip planner update as of 2002 is provided further on under "Web Based Transit Trip Planners."

Website Demonstration Projects. Demonstration projects and other early ventures into providing transit websites provide certain usage details that have value even as website provision matures. One of these early ventures was the Riderlink Demonstration Project in Seattle, started in 1994 as a joint effort of King County Metro and the Overlake Transportation Management Association (TMA). The project tested providing multimodal transportation information including bus route maps and schedules, vanpool and carpool information, ride matching applications, bicycle routes, ferry schedules, real-time freeway congestion maps, and road condition updates. The information was offered both through an Internet website and through electronic touch-screen kiosks at three employer sites in the Overlake area of suburban Seattle.

Metro conducted an evaluation of the first year of the project. It included usage statistics documentation, an online user survey, 82 personal interviews of kiosk users, focus group discussions with TMA Employee Transportation Coordinators, and user feedback forms (Bradshaw et al., 1996). It should be noted that online surveys of website users typically have no means of statistical control, so results must be used with particular caution.

Most users accessed Riderlink via the Internet rather than the kiosks. Access was 56 percent from home, 32 percent from work, and 7 percent from school. University of Washington (UW) students and faculty, who could access Riderlink directly from the UW website, constituted by far the largest single user group, followed by Boeing and Microsoft. Bus service information was the most accessed feature, accounting for 53 percent of page hits. General information, including the real-time traffic map, received 17 percent of the hits;

followed by freeway information, 14 percent; bicycle routes, 11 percent; and vanpool/carpool information, 5 percent.

Of 230 individuals responding to the October 1995 online survey, 47 percent reported commuting by bus versus 46 percent driving alone. Of those driving alone, 43 percent indicated that Riderlink had influenced them to consider other commute options. The survey responses indicate that Riderlink was used in place of traditional bus service information sources. For example, 39 percent of respondents reported they normally used bus timetables, 29 percent used Metro's telephone information system, and 21 percent used Metro's automated telephone information system (Bradshaw et al., 1996).

The Bay Area Transit Information (BATI) website was started in May 1994 as a volunteer effort by students at the University of California, Berkeley. Schedules and most route maps from the major transit agencies in the Oakland-San Francisco metropolitan area were posted on the site. Access logs were maintained, and a survey was put on the website in May 1995. Site users were asked to complete the survey before accessing the desired transit information. A total of 421 surveys were completed, a 24 percent response rate.

Survey respondents had demographic characteristics similar to Internet users, rather than transit users or the population of the Bay Area as a whole. No respondents were over 65, few were under 18 years of age, 40 percent were 25 to 35, and 44 percent were 36 to 64. Occupational status was 79 percent employed, 18 percent students, and 1 percent retired. Approximately 32 percent of the respondents lived outside the Bay Area. Local respondents were primarily from the five urban counties. Finally, 30 percent reported riding transit daily, versus 22 percent riding weekly, 28 percent riding monthly, and 20 percent reporting never using transit.

First time site users comprised 67 percent of the respondents — a result probably inflated by the newness of the site and the medium — while 17 percent reported monthly use, 13 percent reported weekly use, and 3 percent used the site daily. The website was used for both browsing, 55 percent, and for specific information. The browsing proportion of both first time users and non-residents was reported at 60 percent. Frequent users reported checking schedule times on the routes they normally use, and planning a specific trip. Nearly 95 percent indicated they would use the site again and adding more maps was the most frequently requested improvement (Gildea and Sheikh, 1996).

Full Scale Website Applications. The BATI website has been maintained and enhanced over time, including provision of maps and schedules for all San Francisco Bay Area transit operators. One major upgrade allows users to register for regular email updates on new information and schedule changes. More recently a trip planner has been added (see next subsection). Usage statistics are available as part of the site. Use has grown from 282 estimated daily sessions in 1995 to 6,146 in May 1999 and 17,404 in May 2002. Users registered for email alerts of updates increased from 85 when the service was first offered in March 1997 to a high of 12,258 in December 2001. Registered users but not site activity have declined slightly going into 2002 (Bay Area Transit Information, 1999 and 2002).

Selected statistics for individual BATI website page requests, site visits, itineraries provided, and users registered for email updates are given in Table 11-13. Caution must be used in assessing the page request statistics, as it may take more than one page request to obtain desired information. The estimates of average daily site visits and trip itineraries provided may be more comparable to telephone information system call tallies. Note that there are

other transportation and transit websites in the Bay Area, including that of Heavy Rail Transit operator Bay Area Rapid Transit District (BART), included in Table 11-12.

Table 11-13 BATI Website Average Daily Use Statistics, Second Calendar Quarter

Page Request (or Other) Website Usage Category	1998 2nd Q. Daily Avg.	Pct.	2000 2nd Q. Daily Avg.	Pct.	2002 2nd Q. Daily Avg.	Pct.
General site information page	2,345	9.7%	6,564	9.1%	9,503	9.2%
General transit info page	1,175	4.8	1,729	2.4	1,685	1.6
Transit agency info page:						
Schedules	3,921	16.2	12,994	18.0	16,194	15.7
Route maps	640	2.6	1,443	2.0	2,182	2.1
System maps	751	3.1	3,274	4.5	3,367	3.3
Other information	6,981	28.8	18,568	25.7	21,624	21.0
Trip planner requests	0	0.0	17	>0.1	12,555	12.2
Intermediary page requests	8,466	34.9	27,736	38.4	35,934	34.9
Total page requests	24,278	100.1%	72,328	100.1%	103,047	100.0%
Estimated user sessions	3,568		12,747		17,361	
Trip itineraries provided	—		—		4,121	
Email announcement registrants (at end of quarter)	4,992		8,842		10,984	

Note: Intermediary page requests are steps toward obtaining information such as schedule selection lists, trip planner origin-destination selection forms, and map zooming and panning actions.

Page and trip planner requests themselves are only an indicator of activity and areas of interest, as multiple pages may be visited in completing a single inquiry.

Source: Bay Area Transit Information (2002), Escudero (2002).

The Dallas Area Rapid Transit (DART) website produces visitation data using a "cookie" system for tracking usage, avoiding visit estimation. Their data confirm other information on usage patterns, with half of the visitors to the DART site in August 2001 having visited previously. The same data may suggest a core of frequent users. Some 35 percent of return visits represented users returning the same day (Schaller, 2002). On the other hand, some proportion of the same-day return visits may represent site users who realize they have not obtained all the information they need on their first visit.

DART's cookie-based data confirm that transit site visits tend to be shorter than other website visits. The session duration median was 5 minutes, although the average was longer. The average visit depth was four pages, with 14 percent viewing one page and 38 percent viewing five or more pages. Through surveys, DART has found that while only 49 percent of regular riders (at least once a week) have Internet access available, 63 percent of occasional riders (between once a month and once a week) have access, as do 78 percent of infrequent riders (less than once a month) (Schaller, 2002).

The GoVentura Website of the Ventura County Transportation Commission was initiated in 1995. Ventura County, lying northwest of Los Angeles, is on the whole an exurban county. The website provides information on transit, ridesharing, bicycle provisions, park-and-ride lots, and other services in the Los Angeles region. It includes a point-to-point trip itinerary planning feature, enabling users to plan a trip by transit almost anywhere in the five-county region. This feature attracted approximately 200 users a week early on. Results of a survey of trip planner use are presented in the next section, "Web Based Transit Trip Planners."

In response to a question — with multiple answers allowed — on how GoVentura website users previously planned transit trips, 49 percent of survey respondents reported checking printed schedules, 41 percent said they called the Commission's 1-800 telephone number, 22 percent asked other riders, 18 percent called a specific transit agency, and 22 percent noted they did not use transit (Donovan, 1999). This finding about prior information sources, along with the roughly similar Riderlink Demonstration Project results from Seattle reported above, bolsters largely unquantified perceptions of 25 out of 32 transit agencies — surveyed in 2001 — that their websites had generated cost savings through reduced printing and mailing of maps, schedules, and other information materials, and reduced calls to their transit information operators. Three agencies did actually report having specifically quantified cost savings (Schaller, 2002).

GO Transit initiated their Toronto area website in March 1999 (www.gotransit.com). Similar to other such sites, it features information on routes, schedules, fares, stations, connecting services, and pages related to agency functioning and activities. In response to customer comments, a new feature — called "Today's Service Update" — was added in October 2000. This service provides timely updates on the status of GO train and bus operations.

The response to Today's Service Update has been very positive, based on both comments received and number of hits. The feature is one of the most frequently used parts of the GO Transit website, along with schedules and fares. The website received an average of some 3,500 visits or 90,000 page hits a day prior to implementation of the new feature. Afterward, in March 2001, approximately 6,500 visitors were accessing the GO Transit website daily, with some 130,000 page hits (Majerly, 2001). To be sure, given the newness of the overall Go Transit website, it is open to question how much of this "before" and "after" growth is attributable to the Today's Service Update as compared to natural site usage growth.

Today's Service Update demonstrably helps reduce demands on GO Transit's telephone information system. A record daily high of 14,700 visitors and 250,000 page hits was recorded when a train derailed, causing significant service disruptions. During the train derailment, web page use by both riders and the media reduced calls that would otherwise have been made to the telephone system (Majerly, 2001).

Web Based Transit Trip Planners. The new millennium has seen phasing in of personalized transit trip planners on the transit websites of several urban regions. The BATI website's trip planner, for example, was implemented for the city of San Francisco and the East Bay plus Caltrain in July 2001, with addition of bus and Light Rail services in Silicon Valley and north of the Golden Gate anticipated for late 2002. Similar to earlier applications, trips may be defined by address, intersection or landmark name. Itineraries are selectable based on fastest time, fewest transfers, minimal walking or lowest fare. Five different maximum walk distances may be specified. The user may look at a "next best" itinerary for comparison. Walk maps, detailed instructions, departure and arrival times, following bus/train times and

fares are provided. Most trip planners offer walking directions in lieu of maps (Bay Area Transit Information, 2002; Urban Transportation Monitor, 2002).

Even partially implemented, in July 2002 the BATI website's trip planner was receiving a daily average of 14,600 trip planner requests, resulting in 5,400 itineraries provided, nearly a 2 million annual equivalent. Overall the website received a daily average of 19,200 site visits, a 7 million annual equivalent. Compare these estimates — in Table 11-11, with caution — to the late 20th Century tally of 4 million annual telephone calls to the Los Angeles County Metropolitan Transit Authority for all types of transit service information (Bay Area Transit Information, 2002; Escudero, 2002; Hall, Le Colletter and Yim, 1994).

Use of the BATI website's trip planner climbed sharply in its first eight weeks, plateauing at about 18,800 itineraries weekly (just under a 1 million annual equivalent) from September 2001 through March 2002, increasing sharply through June, and possibly plateauing again in July 2002 at between 35,000 and 40,000 a week. In July there were three trip planner requests per itinerary judged to have been provided. Use is strong all week, with Saturday and Sunday each accounting for almost two-thirds as many itineraries as a weekday. Tallies are not available for Bay Area transit telephone information system inquiries, but informal polling has not turned up any indication of changes outside of normal variations. The first significant advertising of the BATI website trip planner is anticipated for early 2003, after addition of San Mateo, Santa Clara and Marin County bus and LRT routes, and other improvements (Bay Area Transit Information, 2002; Escudero, 2002[3]). U.S. websites reporting on the order of one million trip itineraries provided per year — as of early 2002 — included regional transit websites in Minneapolis-St. Paul and Chicago, in addition to San Francisco-Oakland, with Portland, Oregon, close behind (Urban Transportation Monitor, 2002).

A web-based survey was conducted in the summer of 1998 of users of the early GoVentura website trip planning system. A total of 74 surveys (submitted by 66 individuals) were completed, representing about 2.6 percent of the 2,900 queries made over a 5-week period. In addition, the 2,900 queries themselves, the trip itinerary requests, and other data were examined. The vast majority of trip requests were based in neighboring Los Angeles County (82 percent), followed by Ventura County itself (12 percent), and Orange County (4 percent). In terms of frequency of site use, over 1/3 of respondents reported using the website one to several times a week, while a similar proportion used it occasionally, and 14 percent reported first-time transit use. A majority (56 percent) of trip planning requests were made between 11:00 AM and 6:00 PM, with the busiest hour from 4:00 PM to 5:00 PM.

Most of the 66 individuals responding to the survey were current transit riders. Of the respondents, at least 50 percent were making transit trips one to several times a week, with the rest typically using transit occasionally. New users constituted 12 percent. Information needs concerning work commute trips were the most common reason for using the website (43 percent), followed by social and recreation (24 percent), errands or business (21 percent), and school trips (12 percent).

Of the respondents, 70 percent indicated the website helped them make a transit trip that they would otherwise have made by automobile, although only 46 percent reported that they would have made the specific trip by auto if transit had not been available. Over 50 percent

[3] Numerical data provided by Emilio Escudero, Metropolitan Transportation Commission, has been augmented with additional analysis by the Handbook authors.

rated the website in general and specific features as very helpful, and another 6 to 18 percent reported it was somewhat helpful. Males made up 57 percent of survey respondents, which reflects more the characteristics of Internet users than transit riders, where females tend to be in the majority. Users in the 25 to 44 age group were 43 percent of the website clientele (Donovan, 1999).

Ridership Impacts and Promotion Opportunities. Little evaluation of transit ridership impacts of websites is available (Schaller, 2002), and what there is frequently relies on self-reported likelihood or expectation of using transit, a notoriously unreliable guide. Some response percentages to online survey questions with similar problems have been reported above, for lack of more rigorous data, and more will be reported here.

Two small-sample online surveys in the college towns of Santa Cruz, California, and Ann Arbor, Michigan, produced proportions of respondents in the 2/3 to 3/4 range who said that the presence of transit information on the web increased their likelihood of riding the bus (Schaller, 2002). The strongest conclusion possible at this time is that effects on actual ridership throughout the day may possibly be in the same range of 0 to 7 percent favorable ridership impact reported for automated telephone systems and certain other real-time information. That range itself is based on very sparse data, and obviously, the ridership effects of automated phone systems, websites, and other customer information services cannot be expected to be additive overall, though each may have their unique niches.

There are fragmentary clues that support real optimism regarding the ridership enhancement potential of transit websites. Telephone surveys have found surprisingly high levels of interest in transit websites by both infrequent riders and non-riders. For example, Los Angeles County residents with Internet access were in 2000 asked in a telephone survey if they would use the Internet to obtain transit information. The proportions responding favorably were 52 percent for regular users and 58 percent of others (Schaller, 2002). Perhaps more substantive are the actual website visitation data presented earlier for the BATI (San Francisco Bay Area) and GoVentura websites, where 48 to 50 percent of site users reported riding transit less than once a week, if at all.

The greater transit riding turnover for younger adult and higher income riders identified by Oram, well before the advent of transit websites (see "Rider Turnover and Frequency of Use" under "Underlying Traveler Response Factors"), combined with the higher usage of transit websites by younger and higher income adults identified by Schaller and others (see preceding "Internet Websites" subsections) provide a potent combination that should be of special interest as a means of well-targeted information dissemination. Another avenue yet to be explored is the potential for making transit websites part of individualized marketing efforts, covered earlier under "Targeted Promotion" — "One-on-One Personal Promotion." Coming close now to individualized marketing — in the category without incentives — is the offering of personalized itineraries on transit information websites, reported under "Web Based Transit Trip Planners" in the previous subsection.

Real-Time Transit Information Dissemination

Information programs discussed up to this point rely primarily on *fixed* guidance; involving relatively static information such as routes, schedules, and fares. In contrast, real-time transit information dissemination provides either *reactive* guidance, based more-or-less directly on continuous measurement of service conditions, or *predictive* guidance, where real-time measurements are taken together with experience and other data to produce short-term

forecasts of service outcomes. A typical example is anticipated arrival time of the next bus or train.

Relatively few studies have been undertaken to evaluate the effectiveness of real-time transit information in attracting new riders or otherwise modifying travel behavior. Fewer yet are based on actual observed responses, as compared to estimates derived from forward-looking survey question responses and modeling. The actual provision of real-time transit information to passengers and potential riders is attracting substantial interest, but remains in a developmental stage (Charles River Associates, 2001). Available impact findings do not support presentation of a summary table of the type presented earlier for other information and promotion categories, but findings are discussed here to the extent assessments are available. There are as yet no definitive reports of transit ridership increases in response to real-time information dissemination — except in the instance of one beachgoer oriented application — yet there is research clearly indicating that riders appreciate real-time information, make use of it, and are more at ease when it is available.

Potential and Results of Broad-Based Real-Time Travel Information

At this point in advanced traveler information systems (ATIS) development as applied to transit information, the preponderance of user-related research has focused on what is useful and attractive to the potential user. For example, a telephone survey conducted circa 2000 in two northern California metropolitan areas investigated what types and degrees of information are desired by commuters, and whether such advanced transit information would increase the acceptance of transit use. Stated preference experiment results indicated that transit attributes of interest included walking time to the transit stop, service frequency, number of transfers, seat availability, and fares. Some 38 percent of persons who had not used transit in the past two weeks indicated they *might* consider using transit at least once a week if appropriate information was available to them.

Response to real-time urban highway traffic information, mostly radio traffic reports, was investigated during the early 1990s using driver surveys and followup personal interviews. Auto commuter subgroups differing significantly in their response to traffic information were examined. The four significant subgroups identified, in order of importance, were departure time/route changers, those making no travel behavior modification, route changers, and pre-trip plan changers. The incidence of commuters making mode changes was, however, insignificant. San Francisco Bay Area household surveys in 1998 found that 12 percent of the entire traveling population was actually modifying their travel behavior on the basis of radio and television traffic reports, but confirmed the low incidence of mode shifting as a response.

Likewise, analysis of San Francisco's Travinfo® Traveler Advisory Telephone Service field tests at the end of the 1990s found that initially only 1 percent of users asked to be rerouted to the transit menu after learning about bad traffic conditions. With experience, however, the percentage rose significantly, to 5 percent. Of those accessing transit information, 90 percent did choose transit for their trip. Awareness of the Travinfo® service and traffic websites was, in 1998, found to be low. Of the 9 percent aware of Travinfo®, few had actually tried it. Nevertheless, individual Travinfo® users were almost twice as likely to modify travel behavior as radio/TV traffic report listeners, and website users were three times as likely to change behavior (Charles River Associates, 2001).

An online traveler information demonstration that measured traveler response was run in the mid-1990s in the Twin Cities, focusing on the multi-modal I-394 corridor. Corridor buses were equipped for automated vehicle location (AVL). One of the ways the resulting information was made available to commuters was via a "Travlink" online system to which downtown Minneapolis employers and 300 individual commuters were connected. The individuals were, at the start of the project, divided equally amongst bus riders, carpoolers, and drive-alone commuters. Participants were trained in how to use the Travlink system in their homes and offices.

The transit information provided through Travlink was both fixed — the most popular static displays were bus schedules and fare information — and interactive. The interactive component, visited most frequently, included trip planning assistance, road conditions, and real-time bus schedules. After a year that included both bus service reductions and a transit strike, transit ridership among participants was 6 percent higher than among a control group not involved. Project staff believed this was in part due to a sense of control afforded commuters with real-time information at their fingertips (Wright, 1996). Another possibility may have been the training, which in combination with Travlink could have had effects similar to the individualized marketing covered previously under "Targeted Promotion" — "One-on-One Personal Promotion."

Results of Real-Time Train and Bus Arrival Information

Available information from tests and full deployment of real-time passenger information systems placed at bus and subway terminals, stops and stations is summarized here. Test application results from England suggest that the information makes waits more tolerable, and that in situations with multi-route options, passengers use the information for enroute travel decisions. There is little available data, however, to confirm whether the systems have helped generate new ridership or not. The newness of recent U.S. installations, such as at Washington Metrorail stations, limits availability of domestic empirical assessments.

Real-Time Bus Information in Tyne and Wear. A real-time bus information system was tested at the Heworth rail/bus interchange in Tyne and Wear, England, in the mid 1980s. Surveys of passengers were conducted before and during the test to measure use of the system, perceptions, and other impacts. Waiting-time surveys were conducted to evaluate actual versus perceived passenger waiting times, and self-completion questionnaires provided information on passenger profiles, perceptions of choice, and attitudes towards the system. Due to the deregulation of bus industry in England and a change in operators toward the end of the test, no attempt was made to measure the impact on ridership.

The questionnaire results indicated that 75 percent of respondents were aware of the system, 35 percent made use of it to plan their journeys on a more informed basis, 25 percent believed it led them to wait for shorter periods of time, 48 percent thought the information was reassuring and relieved anxiety, 56 percent considered the information wholly accurate, 39 percent indicated they would let a crowded bus go by if the display showed another would be arriving shortly, and 11 percent claimed to use the bus more often as a direct result of the system. A relatively simplistic cost-benefit assessment indicated that a hypothetical 2 percent increase in passengers and fare revenues would produce a 10 percent return on the capital investment per annum and would enable payment of the recurrent annual costs.

First indications from interview results were that, contrary to research indicating that riders overestimate wait-time, passengers at the Heworth bus stand generally underestimated their

wait time both before and during the test. A closer examination indicated that riders waiting for a specific bus underestimated their wait time, while those with destinations served by the next available bus overestimated the wait time. In any case, the real-time information appeared to reduce the perceived wait times, with lower wait times reported during the test than before implementation. The researchers questioned the attribution of any changes in perceived wait time to the presence of the information system, however. Mail-back survey results supported the overestimation of wait-times (Cowell, James and Silcock, 1988).

Real-Time Information on the London Underground. In 1984, dot-matrix signs providing real-time information on the status of London Underground service were tested at several platforms on the Northern Line. The signs gave order of arrival information for the next three trains, route and terminal destination as needed, and the number of minutes before expected arrival. Antique illuminated signs previously in use had supplied the first two of these elements of information, but not the time before arrival. Rider response was evaluated by taking and comparing 4,600 passenger interviews at three matched pairs of platforms – Northern Line platforms with the real-time information system and Bakerloo Line platforms without. The performance of the system in providing accurate information was monitored for 2,600 trains.

Overall, the system performed reliably with only some minor deviations in actual and reported arrival times, which were corrected. Passenger response to the system was very favorable. At platforms with the system, 95 percent of respondents indicated it was useful and 65 percent reported it helped reduce uncertainty in waiting for a train. The information was used by 12 percent to select what train to take, with passengers reporting that they employed the time until arrival in selecting transfer points or choosing to wait for a close-behind train that might be less crowded.

A special mood checklist survey designed to measure an individual's stress indicated a small, but significant, stress reduction in response to the information system, especially for female riders. Passengers both with and without access to the information tended to overestimate actual wait times for trains, but with the information the over-estimation was reduced by 0.68 minutes on average. Train frequency was 3 to 3.5 minutes. The perceived versus actual wait time differential at sites without the information was 0.88 minutes, compared to 0.20 minutes with the presence of the real-time information.

A cost-benefit analysis was prepared by assigning a monetary value to the wait time over-estimation (to estimate social benefits) and by further applying a price elasticity to estimate ridership and revenue generation (to estimate financial benefits). Investment in the real-time information system was thus estimated to provide a simple first year social rate of return of 83 percent, and a first year financial rate of return of 16 percent. Given that the average London Underground trip was found to include 1.3 waits for a train, it was further estimated that system-wide application would provide an additional 30 percent in benefits per passenger (Forsyth and Silcock, 1985).

Countdown Bus Information in London. London Transport's Countdown project involves the provision of real-time information on the status of buses at major stops in the London area. The AVL-activated Countdown signs list the order in which buses will reach the stop, their destinations, and the number of minutes to arrival. Information on traffic and safety conditions can also be displayed. In early 2001, some 1,000 Countdown displays were in operation across London, the largest application of real-time bus information signs in the world. There is a commitment to have 4,000 signs in operation by 2005, providing real-time

information for 65 percent of passenger journeys in the region (London Transport, 2001). Development and implementation of the Countdown system started in the early 1990s. Expansion is occurring in an incremental manner, often in conjunction with other service improvements. The initial test was on Route 18, linking central and west London.

An evaluation was conducted of the initial Route 18 trial. Visual observations found that 90 percent of passengers at the equipped stops looked at the sign at least once during their waiting time. In surveys, 60 percent of passengers said they looked at the sign at least once per minute and 40 percent reported viewing it almost constantly. Sign visibility was rated as very good by 96 percent. Video surveys examining passenger behavior and body language suggested that the system reduced stress levels. Interviews showed strong support for the system, with 90 percent agreeing with the statement "passengers deserve Countdown."

Shorter wait times were reported by 65 percent of those surveyed at Countdown-equipped stops. Average perceived waiting time declined from 11.9 minutes before the trial to 8.6 minutes with the Countdown system. In actual fact, there was no change in bus frequencies and reliability was slightly worse during the trial. In addition, 83 percent of respondents agreed that "if you know the bus is coming time seems to pass more quickly" and 89 percent agreed that the signs made the waiting time more acceptable. Finally, respondents expressed a slight willingness to pay more in fares for the system.

No changes in ridership could be estimated on the basis of the trial. Comparisons against historical passenger revenue trends showed a very slight increase, but no different from other routes out of the same garage. Comparison against a second set of control routes showed that Route 18 performed 1 to 2 percentage points better, but there were more compelling reasons for the differential — mainly labor problems on the control routes — than the Countdown installation. Overall, the trial was considered a success and formed the basis for system expansion (Smith, Atkins and Sheldon, 1994).

Real-Time Bus Information at Rehoboth Beach. Summertime parking and traffic problems in the beach town area around Rehoboth Beach, Delaware, are addressed with seasonal bus services including a park-and-ride Beach Bus. Electronic signs placed at the Rehoboth Park-n-Ride, the Rehoboth Boardwalk, and Dewey Beach's Ruddertown complex, provide both scrolling text messages and AVL-based bus arrival time predictions (NextBus, 2002). In the season following installation, "ridership increased over 13 percent from the year before. No additional service hours or miles were operated…" (Hickox, 2002). This notable response obviously pertains to a recreation and tourist oriented rider clientele, and the electronic sign placement may have had an advertising as well as informational effect.

UNDERLYING TRAVELER RESPONSE FACTORS

The travel choices decision process of the urban dweller can be described as consisting of *mobility choices*, such as the choices of residential location and number of cars to own, and *travel choices*, which involve the day-to-day decisions about where, when and how to travel. The travel time, cost and convenience characteristics of alternative modes, including transit, influence mobility choices to some degree. They influence travel choices to a very large degree, at least among those whose mobility choices have not made them "captive" to a particular travel mode (U.S. Department of Transportation, 1981).

The influence that the characteristics of alternative travel modes have on either mobility or travel choices is dependent, however, on the urban dweller's knowledge and perception of these characteristics. How travelers respond to transit service availability will turn on what information they have and the impetus to act upon it; thus the role of transit information and promotion campaigns and systems.

Information as a Ridership Precursor

The reasoning introduced above may be restated and expanded as follows: For a person to make use of transit service, and thus become a transit rider, he or she must know of the service and understand how to use it. Moreover, the understanding of how to use the service must be complete enough to overcome the barrier to use posed by unfamiliarity. Transit information activities may thus attract potential riders to both transit in general and to particular services by informing them about the options available and how to make use of them. Transit promotion seeks to provide that extra nudge for potential riders to make the leap and actually try riding transit, and hopefully become regular users.

There are a number of reasons why people may be unfamiliar with the transit service available for a particular trip. Many people have simply never used transit. Transit riding in the United States peaked during World War II, but dropped dramatically thereafter as automobile availability increased. Even grade school riders of World War II era transit services are now reaching retirement age. Today only 55 percent of the U.S. public claims familiarity with transit. Only 63 percent of Canadians report familiarity with transit service details (Wirthlin Worldwide and FJCandN, 2000).

Even persons generally familiar with riding transit are often faced with new circumstances where they know little about available services. People change jobs, employment locations, and residences on a regular basis. The next section highlights rider turnover information that helps quantify this shifting of the rider market. The data cover only persons who actually undertake to ride transit, however. The actual share of people rendered unfamiliar with local transit services by job change, relocation or similar factors may be understated by using rider turnover as a surrogate.

Familiarity with transit service availability varies within regions. A survey of employees in the Rock Springs suburban office park within the Maryland suburbs of Washington, DC, where 10 percent of all commuters used transit on any given day, found only 41 percent of the non-users to be conversant with whether or not transit service was available to them. Of this 41 percent, 69 percent knew which transit route to take (Comsis, 1988). A companion survey in the older, closer-in suburban central business district of Silver Spring found the proportion of employees knowledgeable about transit service availability to be much greater. Information for Washington's core suggested, as one might expect, a still higher familiarity.

Regular commuters via transit may still be unfamiliar with services that could be used to meet travel needs outside of their commute corridor and time envelope. The individualized marketing tests and applications in Germany had the same order of magnitude of success in educating existing riders about additional transit use opportunities as they did in informing new riders about available services, as judged by the absolute ridership increases obtained (UITP and Socialdata, 1998).

Rider Turnover and Frequency of Use

Amount of transit ridership is a function of both how many people use transit at all, and how many trips via transit are made per day by those who are transit users. The first of these two conditions is in turn a function of rider turnover — how many new riders there are in any given period of time, balanced against how many cease riding. The second of these two conditions is frequency of use.

It has been found that transit riders are not a static group. Rather, there is ongoing turnover. In significant measure this reflects the constant changing of employment and residence locations already alluded to. Also involved are changes in family circumstances including travel needs and auto availability, and changes in transit service and driving/parking conditions. All of these changes either require or set the stage for new travel choices. This environment of change suggests need for ongoing efforts to continually provide information to potential new riders. The degree of change combined with the effectiveness of transit information and promotion activities will be reflected in the regular turnover in ridership.

Surveys conducted in 1997 and 1998 of transit riders in nine cities throughout the United States found that, excluding Austin, Texas, university bus services, 24 to 50 percent of all bus riders had been riding for less than a year. The corresponding range for five rail transit operations was 25 to 44 percent. These are strong indicators of substantial turnover. Table 11-14 provides additional detail on length of time surveyed riders had used transit. As shown in the table, the survey results also indicate that on any given day, 1 to 8 percent of all riders may be using the transit service for the first time (McCollom Management Consulting, Inc., 1999).

Table 11-14 Duration of Transit Use (Rider Tenure)

System - Mode	Less than 1 Month	1 to 6 Months	7 to 12 Months	1 to 2 Years	2 to 4 Years	More than 4 Years	Total	First Time Rider
Austin - Regular	10.0%	27.6%	12.1%	15.2%	11.9%	23.2%	100%	2.2%
- University	4.7	48.7	8.0	20.1	14.2	4.2	99.9	1.3
Buffalo - Bus	5.7	15.2	9.0	11.2	15.6	43.3	100.0	1.6
- Light Rail	6.6	11.5	7.0	11.2	17.5	46.3	100.1	2.4
Chicago - Bus	5.1	12.7	9.1	12.7	12.7	47.7	100.0	2.6
- Subway/El	5.4	13.2	10.0	16.1	14.4	41.0	100.1	2.2
Grand Rapids	9.9	21.0	10.0	17.1	14.1	27.8	99.9	1.6
Kenosha	5.9	24.1	11.4	17.0	17.9	23.7	100.0	1.1
Lincoln	13.2	21.8	10.3	14.5	13.8	26.4	100.0	1.8
Pittsburgh - Bus	4.4	12.6	6.9	12.7	13.7	49.7	100.0	1.3
- Light Rail	5.4	13.8	9.3	10.0	15.3	46.2	100.0	2.9
Portland - Bus	13.6	18.8	9.2	14.7	13.8	30.0	100.1	6.7
- Light Rail	16.5	19.3	8.7	13.9	16.6	25.0	100.0	7.7
Sacramento - Bus	10.1	22.8	10.9	15.8	15.4	25.0	100.0	2.0
- Light Rail	10.5	17.5	10.6	15.8	18.4	27.1	99.9	3.0

Source: McCollom Management Consulting, Inc. (1999).

Other ridership surveys conducted over the years offer additional perspectives on turnover among transit riders. Surveys of bus passengers conducted 3 to 5 years after the opening of the Shirley Highway High Occupancy Vehicle (HOV) lane in the Washington, DC area indicated that 57 percent started using the bus when they changed employment or home locations rather than when service started on the HOV lane (McQueen et al., 1975). A survey of employees in Sacramento indicted that over a 1 year period some 30 percent of all transit commuters stopped riding the bus to work and were replaced by commuters previously using other modes (Daetz and Holoszyc, 1981).

Many transit passengers are infrequent, rather than frequent riders. A 1992 survey of bus riders in Dayton, Ohio, indicated that riders using the bus three times a week or less accounted for 31 percent of all transit trips and 75 percent of all customers. A 1993 study in Louisville, Kentucky, concluded that passengers who used transit too infrequently to benefit from using a monthly pass accounted for 60 percent of all transit trips and 90 percent of individual customers (Oram and Schwenk, 1994). Additional discussion of rider turnover and frequency of use is provided in Chapter 12, "Transit Pricing and Fares," under "Underlying Traveler Response Factors" — "Transit Use Frequency." Detailed tabulations of 1997-98 frequency of use data for the same nine cities as covered in Table 11-14 are found there.

Findings of this nature lead to the conclusion that potential new transit users must be constantly informed and attracted. UMTA demonstration project surveys not only found as high as 40 percent rider turnover in Sacramento, Cincinnati and Los Angeles; they also found turnover to be most prevalent among those with higher income and auto ownership, as well as among riders in the 18 to 25 age bracket. This suggests a basis for targeting of rider replacement marketing (Oram, 1987).

Service Quality — Actual and Perceived

Obviously, having an actual product or service of value to promote is a key element of any marketing effort. Transit is no exception. Transit services must be available to the groups or areas being targeted, must serve major origins and destinations, and need to be available at the times travelers are making their trips. The best information and promotion program cannot save a bad product or no product at all.

No sources were found that explicitly documented differences in effectiveness among transit information and promotion campaigns under conditions of different levels of service quality. It is logical to assume, however, that at least a basic level of service, or a targeted service, needs to be available in order for any type of information and promotion effort to be successful.

There has been an evaluation of HOV Lane marketing, a close parallel, that did examine product quality. Seven case studies were examined, covering four definitive successes and three project failures. The evaluation found that the best marketing tool was a well conceived and well executed project. It further concluded that "no amount of marketing is likely to save a badly flawed project." The comparisons made included two projects with nearly identical marketing plans and expenditures, where one (I-394 HOV in Minneapolis) has been generally acknowledged as a success, and the other (Santa Monica Freeway diamond lanes in the Los Angeles area) failed outright. One outright success, the obviously attractive San Francisco/Oakland Bay Bridge HOV lanes, received little marketing attention (Billheimer, Moore and Stamm, 1994).

Studies of the potential for transit use conducted in connection with development of individualized marketing in Europe examined transit options for individual trips in 115 German cities from perspectives of both actual and perceived conditions. For context, it is pertinent that 16 percent of all trips in the average city were being made on transit.

It was found that on average 1/2 of all trips were impractical to make via transit, either because of outside constraints such as need of an auto for business (26 percent of all trips) or because no adequate transit service connection existed (24 percent). Of the 1/2 deemed practical to make via transit, current transit riding accounted for the previously noted 16 percent of all trips, and "only subjective reasons" were given for not utilizing transit for the rest (34 percent) (UITP and Socialdata, 1998). It is a fuzzy line between "subjective reasons" and the more negative aspects of service quality, like the wait for a bus, but the research did indeed identify adverse perceptions of riding transit that could possibly be remedied with information.

Among trips being made in the 115 German cities by private vehicle, but where transit use was practical, 46 percent of trip makers were deemed partially or well informed about the public transit alternatives, and the rest displayed fragmented or no knowledge about the transit alternative. This 1995 result was down from 52 percent "informed" in 1976. Counting only the 46 percent of trips involving "informed" trip makers, it was found that travel time via transit was being overestimated by 45 percent, while travel time via auto was being underestimated by 18 percent. Similarly, transit user costs were perceived to be 21 percent higher than actual, and costs of travel by private vehicle were perceived to be 58 percent lower than actual (UITP and Socialdata, 1998). Addressing these perceptions was part of the task of the "individualized marketing" approach previously discussed under "Traveler Response by Type of Program" — "Targeted Promotion" — "One-on-one Personal Promotion" and explored further in the case study "Individualized Transit Marketing In Europe."

How travel time is perceived may be related in part to the amount of "travel stress" involved. It has been argued that the value of travel time — presumed to be negative — includes at least two components, the lost value of time that could have been spent doing something else, and the disutility of the travel experience. Disutility, in this sense, represents the inconvenient and unappealing aspects. A related assumption is that this disutility is likely to be higher when lack of information creates anxiety or stress.

That deduction has special relevance to real-time information, where information about travel times and conditions ahead may be provided. Surveys have shown that trip makers appreciate having travel information at hand even if they don't or can't modify their travel behavior. Respondents typically claim that their level of anxiety or stress is reduced by knowing what conditions are going to be (Charles River Associates, 2001).

Service Design — Simple or Complex

The degree of routing and scheduling simplicity offered to the transit user will affect the ease with which the potential rider becomes informed, either on his or her own, or with information provided by the transit agency. It appears that a readily transparent service design can to some extent market itself insofar as user information needs are concerned. In contrast, a highly complex operation places heavy demands on the provision of information and the rider's ability to interpret and absorb it.

The Santa Monica Municipal Bus Lines operation is regarded as one of the simplest, most easily understood transit systems in California. Nevertheless, results of a joint focus group of riders and non-riders demonstrate that a fairly sophisticated expertise must be developed to use the transit service for all trips. Non-riders in the focus group "looked on with bemused admiration as riders explained some of the complexities they had learned in using the system." While having mastered the system was a point of pride for some riders, the complexities were clearly not attractive to non-users (Nelson\Nygaard, 1997).

Similarly, transit operators in Germany have concluded that when route structures are complicated and departure times are not standardized, it is hard to provide service information in a clear and straightforward presentation that passengers can easily grasp and remember (APTANet, 2002). Transit riders must know two geographies, that of the street system and that of the transit system. It has been deduced that having simpler, straighter transit routes, associated as much as possible with major arterials, helps make transit operations more transparent to the user (Nelson\Nygaard, 1997). Other characteristics of system simplicity include avoidance of route branching and deviations, and use of schedules that are either sufficiently frequent that timetables are irrelevant, or else are organized around simple "clockface" times, e.g., terminal departures on the hour and half-hour. It helps as well to have fares that are readily understandable and easily paid.

It has been further deduced that having a transit system transparent to the user "can make the system vastly more attractive for casual, spontaneous use" and that failing to do so may easily put off "non-riders with only a moderate inclination to try transit" (Nelson\Nygaard, 1997). Empirical evidence supportive of these conclusions exists. Effects of transit system simplification are covered in Chapter 9, "Transit Scheduling and Frequency" and Chapter 10, "Bus Routing and Coverage." Specific instances are reported in those chapters where it has been possible to infer the effect on ridership of system and schedule simplification, or at least the effect of simplification in combination with other supportive actions. Following is a summary of key findings, with citations. For more detail on the observations drawn from Chapter 9, see the discussions in that chapter under "Response by Type of Strategy" — "Regularized Schedule" — "Minimizing Passenger Wait Times" and also "Timed Transfer Findings." Similarly, for the examples from Chapter 10, refer to "Response by Type of System and Strategy" — "Service Restructuring" — "Variations on Hub and Spoke Configurations."

Chapter 9 offers the conclusion that easy to remember departure times and readily available schedules appear to be significant contributors to achieving a favorable user perception of the wait for low and medium frequency transit service, with limited but consistent examples of ridership gains in response being reported. Note is made of a 1980 compendium of international purview that reported at least anecdotal evidence of appreciable gains in ridership when schedules have been reorganized to give simple "clockface" timings (Webster and Bly, 1980). Travel estimation research is observed to suggest that the wait for commuter trains is perceived by commuters as being some lesser amount than straightforward wait time calculations that work for bus services would imply (Parsons Brinckerhoff et al., 1994). Readily available schedules and long-term dependability of service, allowing minimization of user wait time at stations, are presumably major factors.

Chapter 9 observes that many successful restructurings of small city bus service and midday commuter service have employed "clockface" scheduling as one aspect of the overall design (Pratt and Copple, 1981). The case study "A Combined Program of Improvements with Fare Changes in Iowa City," in Chapter 10, describes an example.

A Chapter 9 example involving a larger urban area is that of Omnitrans in Riverside, California, where both route and schedule simplification were undertaken. Ridership increased by 20 percent, five times the increase in bus hours of service. The route restructuring enhanced direct travel, while the schedule restructuring emphasized consistency and ease of transfer, with all schedules standardized on 15, 30 or 60 minute on-the-hour intervals between buses (Stanley, 1998). Timed transfer service design — which typically involves "pulses" of service at 20, 30 or 60 minute intervals — seems to improve rider satisfaction. Patronage effects are indeterminate given presently available data, however, as in the fairly recent implementation of a timed-transfer system in Norfolk, Virginia (Charles River Associates, 1997; Rosenbloom, 1998).

Chapter 10 provides additional evidence that well designed service simplification attracts additional ridership. Service revisions in Orange County, California, that included offering more direct service on major arterials and making system schedules more consistent, along with a number of other routing changes, produced ridership attraction success similar to that reported above for Omnitrans in Riverside (Rosenbloom, 1998; Stanley, 1998; Volinski, 1997). King County Metro has been shifting from complex suburban schedules to hub and spoke operations offering somewhat simpler schedules. All four of King County Metro's most extensive service redesigns of this type produced total weekday ridership gains in excess of the local area unlinked passenger trip growth, and most did so while either maintaining or exceeding local area growth in service productivity (King County DOT, 1998a and b; Harper, Rynerson and Wold, 1998-99).

In none of these instances has the role of transit information and promotion per se been recorded — except by inference — but it is not a huge leap to presume that if system simplification attracts additional ridership, then an underlying mechanism must be that truly easy to use systems do provide their own information and promotion by their presence, or at least contribute significant support to successful service information dissemination and marketing efforts.

User Processing and Application of Information

The benefits of information provision are inherently limited by the ability of the recipients to process and use the information. Some research has been done on this limitation, covering schedule, map and telephone information. In addition, a framework has been hypothesized as to how information is applied, at least in the context of Advanced Traveler Information Systems (ATIS).

Two research studies, while identifying low success rates in using either maps or schedules, suggest that map use outcomes are better than attempts to read conventional schedules. In one study, the researchers concluded that between 23 and 69 percent of 580 participants were not able to plan a real transit trip using a transit route guide. They found 91 percent unable to figure out from a schedule when the next bus would pass near their home. In the other study, 15 students provided with maps reached their destination in significantly less time than 20 given no information at all. Surprisingly, however, 15 students receiving both maps and schedules did less well than those with maps only — an apparent case of information overload. A third study simply identified limitations in the use of maps. Among 20 students provided New York subway maps and asked to visit 5 stations in sequence, all lost time by choosing indirect or inappropriate routings or having to backtrack (Hall, Le Colletter and Yim, 1994).

A 1993 test in Los Angeles, conducted in a downtown shopping mall with 120 participants, was designed to examine the provision and use of transit information provided by the area's telephone information system. Use of both human operators and a synthesized voice system for obtaining trip itinerary advice was tested, coupled with participant interviews.

Reactions to and understanding of information was better with live operators than with the synthesized voice system. On average, participants took down 12.5 of 17 information elements presented with the human operators, versus 10.5 with the synthesized voice. With live operators, 87 percent rated instructions given by operators as "easy to follow," versus 24 percent for the synthesized voice system; 91 percent agreed the operator pronounced words very clearly, compared to 24 percent for the synthesized voice; and 82 percent perceived the operators to be friendly, while 75 percent rated the synthesized voice as neutral. As might be expected, frequent transit users recorded less information than non-users for both systems.

While 56 percent of participants reported the information provided by the human operator encouraged them to ride transit, only 36 percent said so for the voice system. Of participants, 95 percent indicated they preferred human telephone operators because of potential for interaction (91 percent), clarity of directions (83 percent), clearer pronunciation (79 percent), and better speech speed (76 percent). A monitoring of 92 random telephone information requests not associated with the test indicated that 62 percent could be handled with direct answers, while 38 percent involved additional questions from the caller. Overall, the study concluded that the potential to generate transit trips is higher with human operators and with individuals who are current riders (Hall, Le Colletter and Yim, 1994). It is very important to note, however, that these particular tests involved requests for complete itineraries, and not simple requests for upcoming bus or train arrival times.

Researchers Polydoropoulou and Ben-Akiva have hypothesized a general framework for the process of consumer adoption and use of ATIS. The framework is described in terms of six partially interrelated stages of information processing and application by an individual consumer (Charles River Associates, 2001). It would seem this framework could apply not only to new transit information systems but also to use of transit services in general:

- Awareness — the potential user's state of knowledge and perceptions about a service and its characteristics.

- Consideration set formation — the potential user's placement of the service either in a new mental category or, depending on experience and perceptions, together with other travel services.

- Choice set formulation — the traveler's development of a potential set of solutions to an identified travel need based on perceived attributes, benefits and costs.

- Trial use — the traveler's decision to use the service for some particular trip.

- Repeat use — the traveler's assimilation of the service use into a continuing or habitual travel behavior.

- Travel response — the consequent behavioral response of the user, which in the case of transit services themselves would be travel behavior. In the hypothesized case, that of

ATIS, the information use response and the degree to which travel behavior is in turn affected are both included.

The interrelationships between these stages are pictured as depending on learning. Trip learning by means of repeat use is presumed to involve adjustments to best utilize the system, and possible decisions over time to utilize other options (Charles River Associates, 2001). Prepping, encouraging, inducing and supporting a potential transit service user through these stages would seem to be appropriate individual goals for informational and promotional campaigns and systems.

RELATED INFORMATION AND IMPACTS

Influence on Awareness and Public Support

A recent Transit Cooperative Research Program (TCRP) study has concluded, "Evidence clearly suggests that increased awareness and familiarity with public transportation increases support." As noted already, only 55 percent of the U.S. public claims familiarity with transit, and only 63 percent of Canadians report familiarity with transit service details. The study that made this determination finds that lack of familiarity accounts in large part for lukewarm feelings toward public transportation (Wirthlin Worldwide and FJCandN, 2000). While the study in question focuses on image building, one may also reasonably conclude that all kinds of transit information and promotion programs that help raise awareness of transit services in an area must concurrently enhance feelings toward public transportation.

This relationship has been given added credence by followup surveys of the "individualized marketing" tests conducted in Europe in the 1990s. While the program focused primarily on attracting additional transit ridership through provision of personalized information and inducements, the evaluation phase did follow up on changes in satisfaction as well as changes in transit riding. In 7 completed large-scale applications in Germany, there were 4 high-performing projects and 3 medium performers in terms of ridership gain. Similarly, although not in exact parallel, four of the projects were high performers and three were medium performers in gains in expressed satisfaction with public transit. There were no low performers or losers among the 7 applications in either regard. The results for 17 completed pan-European demonstrations that obtained satisfaction data were quite similar (UITP and Socialdata, 1998).

Available information on the effectiveness of U.S. and Canadian informational and promotional programs in raising awareness is summarized in Table 11-15. Additional information on recall of specific promotional themes and related insights was provided in the text and tables of the "Traveler Response by Type of Program" section.

Mode Shifts and Impact Decay

Practically all reports of travel changes in response to transit information and promotion concentrate solely on the degree of increase, if any, in transit ridership, as contrasted to providing data on mode shifts. The "individualized marketing" tests conducted in Europe in the 1990s do, however, give comprehensive before and after mode share data for the target

population. These experiments are described in the case study "Individualized Transit Marketing in Europe."

Table 11-15 Percentage Awareness Obtained by U.S. and Canadian Informational and Promotional Efforts

System	Program	Date	Awareness
Hamilton Street Railway	Bus Check telephone info system	1990	69%
Southeast Wisconsin Area Cities	Two phase campaign	1997	
Media campaign	Image promotion		50
Green Bay Packers promotion	$1.50 a day pass promotion		62
Ann Arbor Transp. Authority	Cable television advertisements	1991 on	
riders	ad recall		80
non-riders	ad recall		60
Chicago Transit Authority	Skokie Swift Extension	1964	96
Chicago Transit Authority	Green Line Reopening	1996	86
SEPTA (greater Philadelphia)	Commuter railroad improvements	1965	
all households	short/long term recall		33/ 7
actual users	short/long term recall		51/10
potential users	short/long term recall		42/ 4
Tidewater Regional Transit	Targeted direct mailing of info	1996	22-24
Ames Transit Agency	Iowa State student paper ads	1995	75

Source: "Traveler Response by Type of Program" section of this chapter.

Table 11-16 illustrates the mode shares before and after individualized marketing for Kassel and Nürnberg, Germany, target populations. The "after" shares are given for both the intermediate time frame of one year after the marketing, and for longer term time frames. Control group data is also provided.

Table 11-16 Percentage Mode Shares Before and After Individualized Marketing, and Their Stability over Time, Nürnberg and Kassel, Germany

	Nürnberg				Kassel				
		Test Group					Test Group		
Mode of Travel	City Total (1992)	Before (1992)	1 Year After (1994)	2 Years After (1995)	City Total (1991)	(1994)	Before (1991)	1 Year After (1992)	4 Years After (1995)
Public Transport	20%	14%	23%	21%	18%	19%	8%	17%	16%
Non-Motorized Travel	33	27	29	26	34	35	25	23	23
Private Vehicle Driver	36	44	38	40	37	35	48	44	46
Pvt. Vehicle Passenger	11	15	10	13	11	11	19	16	15

Source: UITP and Socialdata (1998).

The information in Table 11-16 can also be used to estimate the decay in the impact of the individualized marketing. This decay appears to be extraordinarily low for these two initial test cases. The increases in mode share were diminished by only 10 percent or so after 2 to 4 years. For purposes of benefit estimation, an assumption conservative by comparison was used by the investigators — a projection that the effect of individualized marketing will drop by 20 percent every year and will disappear after 5 years (UITP and Socialdata, 1998).

Even an impact decay taking 5 years for all effects to be dissipated is much more gradual than anything reported for other than the "individualized marketing" tests. Demonstration project results from Pittsburgh show ridership gains following targeted distribution of maps and schedules in the Penn Hills corridor to have kept half their positive ridership impact into the second 3-month period of the project, even after civil unrest caused a city-wide drop in transit riding (Port Authority of Allegheny County, 1970). The effect of a mass market brochure distribution in 5 rural British towns dropped by 75 percent in 4 months (Ellson and Tebb, 1978). It is reported that the Canadian city of Pembroke enjoyed a 53 percent increase in ridership over 3 years after a multifaceted promotional campaign that among other things included free ride days, and had caused ridership to be up 35 percent during the promotion and 30 percent the week after. No causal analysis of the 3-year increase was provided (Ontario Urban Transit Association, 1988).

Public awareness of Philadelphia area commuter rail improvements, developed through multifaceted promotion, dropped by 80 to 95 percent before the demonstration project was completed (Southeastern Pennsylvania Transportation Authority, 1969 and 1971). Riding on a specially promoted new express bus service in St. Louis fell back in line with other new express services after 3 months (W.C. Gilman and Co., 1966). The vast majority of information and promotion project evaluations have failed to follow through on the issue of rider retention, and offer no contribution to assessing whether or not results of promotions reflect other than transitory influences.

Peak Versus Off-Peak Ridership Effects

Information regarding transit information and promotion effects on peak versus off-peak ridership is limited, but that which exists is fairly convincing. Each of the few cases in which peak and off-peak effects have been differentiated in some way indicates that impacts are stronger in the off-peak, as expressed in higher percentage ridership gains in the off-peak than in the peak, or some equivalent.

For example, practically all of the ridership gains in the 1970 information campaign targeted on the Penn Hills area of Pittsburgh occurred during the off-peak. Off-peak ridership increased 3 to 6 percent in response to corridor map and schedule distribution, while peak period ridership climbed 1/2 of a percent at most (Port Authority of Allegheny County, 1970). In Portland, Oregon, free passes distributed to introduce riders to new LRT feeder bus services, but good on all transit routes including the LRT, appear to have been used more heavily for off-peak travel than for peak-period commuting. New riders used the passes for more shopping and more recreation trips than work purpose trips, and even prior Tri-Met riders used them for more shopping than work trips. This outcome occurred despite the fact that the promotion itself focused solely on commuting, and did not even provide off-peak schedules (Pedersen, 1989).

In Norfolk, Virginia, free ride coupons mailed to residents along selected bus routes were used more for off-peak trips than for peak travel (Capo and Messmer, 1987). In Chicago, persons targeted in CTA's "New Mover" program reported more overall use of transit for shopping, social and entertainment than was observed for average riders (Chicago Transit Authority, 1999). When WMATA in Washington, DC evaluated their telephone information system by surveying information system users, they found that 56 percent of the transit trips made on the basis of a telephone inquiry were taken off-peak. Systemwide only 37 percent of transit trips occurred off-peak (Hall, Le Colletter and Yim, 1994). An 8 percent off-peak ridership boost in Ottawa and Carleton was the reported response to implementation of O-C Transpo's automated telephone information system (Parsons Brinckerhoff, 1996). There was also a peak period ridership effect (Hall, Le Colletter and Yim, 1994), but it was apparently less significant.

The most comprehensive data available is from the European "individualized marketing" tests, described in the case study "Individualized Transit Marketing in Europe." Although peak versus off-peak effects were not surveyed directly, the purposes of trips taken before and after the individualized marketing were obtained. It may be inferred from the greater increase in non-work, non-school purpose trips, particularly for shopping and services, that off-peak riding increased more than peak riding in the short term: 1 year after (UITP and Socialdata, 1998). That relationship was damped by the second year in Nürnberg, however, and reversed by the fourth year in Kassel. Table 11-17 presents the individualized marketing results for the tests in Nürnberg and Kassel, with complete trip purpose breakdowns.

Table 11-17 Effects of Individualized Marketing on Use of Transit by Trip Purpose, Nürnberg and Kassel, Germany

	Nürnberg Test Group						Kassel Test Group					
	Before (1992)		1 Year After (1994)		2 Years After (1995)		Before (1991)		1 Year After (1992)		4 Years After (1995)	
Trip Purpose	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.	No.	Pct.
Work	28	28%	41	25%	43	29%	20	20%	37	17%	40	20%
Education	21	21%	24	15%	20	13%	5	5%	11	5%	16	8%
Shopping/Services	31	31%	71	43%	65	43%	34	34%	82	39%	78	39%
Leisure	17	17%	25	15%	21	14%	35	35%	72	34%	62	31%
Other	3	3%	3	2%	1	1%	6	6%	10	5%	4	2%
Total	100	100%	164	100%	150	100%	100	100%	212	100%	200	100%

Note: Numbers of trips normalized to 100 total in the before condition for each city.

Source: UITP and Socialdata (1998).

Impacts on VMT, Energy, and Environment

Very little information is available on the influence of transit information and promotion on vehicle miles of travel (VMT), energy, and the environment. With the relative scarcity of quantitative data on the influence on ridership of various programs and techniques,

estimating secondary impacts relating to VMT, energy, and the environment has not been a priority. There appears to be no reason why the impact would not be, at the very worst, neutral. To the extent that transit information and promotion activities influence individuals to use transit rather than driving, the impact on VMT, energy use, and the environment will assuredly be positive, although probably small.

Effectiveness and Benefit/Cost Findings

The effectiveness of an individual information or promotion program can properly be evaluated only as measured against the objectives of that particular effort, and there are a wide variety of objectives for such programs (Oram, 1987). Objectives, as outlined in the introductory section, range from "hard" ones like increasing transit ridership to "soft" ones such as raising public awareness of transit's social benefits. While the primary interest in this chapter is in assessing effects on transit usage, and associated farebox revenue, other aspects such as changes in public attitudes have importance as well.

When assessing an individual information or promotion program against objectives of increasing ridership and net revenue, trade-offs may come into play. A program that increases both ridership and net revenue may clearly be considered a success, and one that decreases both, a failure. Programs that decrease one but increase the other entail assessing the tradeoffs involved, however, and require a determination of which has priority, ridership or net revenue (Oram, 1987).

A key issue in any program is obviously the matter of cost, and the extent to which that cost may be recovered. As might be imagined from the state of information on ridership response to information and promotion, only a few evaluations have considered cost effectiveness measures such as the cost per new rider or benefit/cost ratios.

The costs of a demonstration project handout of color-coded maps and schedules in the Penn Hills corridor of Pittsburgh were recovered in 6 months from increased farebox revenues despite disruptions (Port Authority of Allegheny County, 1970). Milwaukee County Transit estimated a benefit/cost ratio for its direct mailings of free-ride coupons, which also served as contest entries, to residents along poor-performing bus routes. In the one estimate reported on, 15 percent of contest participants were identified as new riders, and the estimated benefit/cost ratio was approximately 2.6 (Oram, 1987).

The CTA "New Mover" program provides another example of a benefit/cost assessment conducted as part of a marketing program evaluation. The project included mailing an automated fare card with two free rides, a CTA map, and a timetable for services at the nearest rail station to new residents in the Chicago area. Over the first year of the program, the CTA estimated a 3.3/1 benefit/cost ratio based only on new riders attracted by the promotion and a 6.6/1 benefit/cost ratio including both new and an estimate of retained riders (Chicago Transit Authority, 1999).

There is significant danger that less favorable benefit/cost ratios for promotion have simply not made their way into the literature. Nevertheless, the risk of fielding a well-considered information or promotion campaign is low, and chances appear very good that efforts that don't entail too much transit agency "give-away" will at least break even if not actually produce net revenue gain from the added transit riding induced.

One means to reduce the transit agency's "give-away" in promotions involving incentives is to tailor the incentives to the likely individual market segments. Under this approach, free-fare incentives are focused on new riders, while current riders receive non-fare incentives (Oram, 1987). This is exactly the approach used in the "individualized marketing" programs in Europe, where extensive periods of free riding are allowed new riders, but the benefit/cost ratio for new programs is nevertheless estimated at 3.4/1 based on experience to date. As part of this estimate, it was calculated that costs should be fully covered by the first year's added farebox revenue (UITP and Socialdata, 1998).

The efficiency of promotions from the perspective of the transit operator can be markedly improved by involving private sector sponsorship. For example, such involvement provided free hamburgers for Orange County Transit District's 1984 "Transit Discovery Day," representing a $1.85 value each. Riders boarding before noon received a free hamburger coupon — 50,000 of which were distributed. Ridership that day was the 8th highest recorded. Higher revenue from the increased riding more than offset OCTD's promotion advertising costs (Oram, 1987).

Private sector entities such as local banks have even been successfully approached to sponsor free rides or fare-free days by covering revenues foregone. Sponsored free food coupon promotions, and also sponsored promotional fare reductions, have been identified as typically producing successes where both ridership and revenue increases are produced. Without private sector sponsorship, promotional on-board fare reductions tend to fall in the trade-off category where ridership gains are accompanied by revenue losses (Oram, 1987). There are many apparently successful variations on merchant-sponsored incentives and other private sector involvement in transit promotion.

ADDITIONAL RESOURCES

Synthesis of Transit Practice No. 12 of the National Cooperative Transit Research & Development Program, predecessor to the Transit Cooperative Research Program (TCRP), encapsulates and synthesizes the results of a number of transit information and promotion projects, along with other marketing endeavors. The analysis of failures along with successes is especially helpful (Oram, 1987).

A number of recent TCRP reports focus on different aspects of transit market research and marketing. The emphasis is more on marketing approaches and applications than on the influence of marketing on ridership and changes in travel behavior. *TCRP Report 37*, "A Handbook: Integrating Market Research into Transit Management" examines current market and organizational theory, documents current practices, and provides examples of successful applications of market research in the transit industry (Elmore-Yalch, 1998a). *TCRP Report 36*, "A Handbook: Using Market Segmentation to Increase Transit Ridership" covers how to use market segmentation as an effective transit market research tool, with applications examples (Elmore-Yalch, 1998b). *TCRP Report 45*, "Passenger Information Services: A Guidebook for Transit Systems" provides design guidance for transit passenger information materials (Texas Transportation Institute and Nustats International, 1999).

TCRP Report 50, "A Handbook of Proven Marketing Strategies for Public Transit" highlights examples of transit information and promotion programs (Texas Transportation Institute et al., 1999). *TCRP Report 63*, "Enhancing the Visibility and Image of Transit in the United States and Canada" examines ways to improve the image and perception of public transportation

services (Wirthlin Worldwide and FJCandN, 2000). *TCRP Synthesis 43*, "Effective Use of Transit Websites" covers transit website development, content, usage, design, costs and administration (Schaller, 2002).

Finally, the "High Occupancy Vehicle (HOV) Lane Marketing Manual" prepared for the Federal Highway Administration provides in depth case study assessments of public information and promotion programs related to HOV lanes, primarily before and during their introduction (Billheimer, Moore and Stamm, 1994). This is another resource that addresses both successes and failures.

CASE STUDIES

Information and Promotional Campaign Demonstrations in Pittsburgh, Pennsylvania

Situation. The Port Authority of Allegheny County (PAT) operated 183 transit routes in the mid-1960's. The average weekday ridership on the system was approximately 360,000. In 1970, the number of annual transit rides per capita was 65.5. The PAT was interested in increasing ridership on the system, especially off-peak. With federal sponsorship, a demonstration project was conducted in which concepts and techniques were tested for advertising, promoting, and providing information on the existing PAT system. Local and national social unrest partway through the project, with civil disorder, clouded outcomes but produced an instructive laboratory illustrating what may happen when marketing messages are out of sync with the target market's immediate issues.

Actions. An attitudinal survey was conducted in selected areas to help in design of the marketing programs. Based on survey responses, two different approaches were developed and implemented. The first approach concentrated on better information dissemination and the second on advertising to improve the perceptions of transit services. Within that context, the marketing programs included a number of specific elements. In response to the survey finding that residents of the Penn Hills area had a particularly low opinion of available transit information, and seeing that the existing multi-route service was indeed poorly described by available timetables, a multi-color Penn Hills transit map and consolidated schedule was developed. It was distributed as an insert in a local newspaper, and upon request. The cost for this program component was $7,600.

A $47,000 *Summer Fun* multi-media campaign was conducted stressing comfort, convenience, service, information, and price. A $2,200 campaign was undertaken in minority-oriented newspapers and radio stressing public transit ownership and service to the African-American community. A $3,700 local radio and newspaper promotion was conducted in the McKeesport community stressing McKeesport's involvement in the transit service. A downtown transit guide was prepared highlighting downtown transit stops and shuttle services. Approximately 150,000 copies of the guide were distributed as part of a $65,000 Christmastime newspaper, radio, and television campaign stressing the economy and social acceptability of shopping using transit.

Analysis. A ridership simulation model was developed to quantify expected ridership variations in response to variables such as weather, season, work and school holidays, and secular patronage trends, to provide a more accurate basis for identifying the influence of the

promotions. Ridership levels were monitored and outside influences were documented. Unfortunately, a number of unforeseen events occurred during the campaign that could not be controlled or quantified. These events included a work stoppage by transit operators that affected riders in the Penn Hills project area, plus the 1968 civil unrest accompanied by imposition of a curfew — which led to protracted negative effects on ridership — and the implementation of exact fare requirements.

Results. Responses varied to the various promotional efforts. Prior to the civil disorders, a 6 percent increase in off-peak ridership and a marginal gain in peak ridership was recorded on the Penn Hills routes covered by the informational campaign. After the civil disorders, a 3.5 percent increase in off-peak ridership was still realized, while peak ridership was up 0.4 percent. The off-peak gain was statistically significant, while the small peak ridership growth was not. Increased fare box revenues recovered the $7,600 cost of the promotion in 26 weeks. In contrast, the ridership response to the downtown transit guide was mixed and inconclusive.

The *Summer Fun* multi-media campaign, African-American-oriented newspaper and radio advertising, and McKeesport radio and newspaper campaign did not appear to have a positive influence on transit ridership. Passenger declines of 1 to 8 percent were recorded with statistical reliability ranging from not reliable to marginal reliability. Follow-up additional surveys indicated that public perception of most aspects of transit service had deteriorated. The civil unrest was identified as affecting attitudes on the social acceptability of public transit. Further, the exact fare requirement and discussion of possible fare increases were felt to have affected attitudes related to the cost of riding transit. Overall, the advertisements appeared to not only have failed to improve public attitudes toward transit but may have created a credibility gap between the ads promoting good transit service and the public perception that service was deteriorating.

Sources. Port Authority of Allegheny County, "Advertising and Promotion Demonstration Program." Urban Mass Transportation Administration, Washington, DC (1970). • Pratt, R. H., and Copple, J. N., *Traveler Response to Transportation System Changes*. Second Edition. Prepared for the Federal Highway Administration, Washington, DC (July, 1981).

Transit Research and Marketing in Southeast Wisconsin

Situation. The urbanized area of southeastern Wisconsin comprises a number of cities, stretching from the Illinois border to the north of Milwaukee. There are four major public transportation services in the area — the Milwaukee Transit System, the Racine Belle Urban Transit System, the City of Kenosha Transit System, and the City of Waukesha Metro Transit System. Historically, each system conducted its own marketing activities, and a regional focus for transit was lacking.

Actions. In the mid-1990s, the Wisconsin Department of Transportation and the four transit agencies initiated a coordinated market research and promotional program for the region. The market research components included four suburban oriented focus groups — two with current riders and two with non-riders — and a benchmark survey of 900 telephone interviews. The results of the market research were used to develop two promotional campaigns. The first was an image campaign and the second was focused on increasing ridership. The message of the first campaign was shaped to target specific markets identified in the focus groups as offering high potential as sources of new ridership.

The image campaign used humorous newspaper and radio advertisements to link public transit with other important community issues — primarily economic development and education. The second program used television spots, along with radio and newspaper advertisements, featuring Green Bay Packer football players, promoting transit ridership. A promotional $1.50 all-day pass was available during the campaign to encourage ridership.

Analysis. Impact monitoring and evaluation included tracking studies conducted after each phase of the marketing program. After the image campaign, 427 randomly selected telephone interviews were conducted, and 413 were completed after the ridership promotion. In addition to analysis of the survey data, both the final project report and Wisconsin DOT examined revenue rider statistics from the involved transit operations.

Results. Tracking study interviews focused on obtaining feedback on ad recall, shifts in attitudes about transit, and changes in ridership. Approximately 1/2 of those interviewed after the image campaign recalled seeing the advertisements, while 1/2 did not, with no reported difference between the markets targeted with the message and respondents in general. There was no change in awareness of specific transit services after the campaign. Although improving public transit continued to rank behind other community issues, there was a slight increase in the proportion rating it as an extremely important community issue. More respondents indicated a link between good public transportation and economic development than any link between transit and education, despite equal emphasis on both during the campaign.

Although the first campaign focused on enhancing the image of transit in the region, some apparent changes in transit use turned up in the interviews. There was no significant change in the overall proportion of the survey population riding transit from the benchmark, but an increase in the number of rides reported as being taken was noted. This increase was concentrated in the 35 to 54 and 18 to 34 age groups, where benchmark survey usage in the past 30 days was in the two to three trip range, compared to four to seven rides in 30 days after the first wave of research. While other factors, such as normal seasonal fluctuations, were felt to have contributed to these increases, some of the increase in ridership frequency was attributed in the study to the regional campaign and local advertising.

More than three out of five individuals interviewed after the second campaign recalled seeing, reading, or hearing transit advertising in the last 30 days. Recall of the Green Bay Packers players was higher (13 percent for players in general and an additional 11 percent for the specific players) than for the $1.50 all-day pass. Name awareness of the local transit systems increased further after the second promotion. Respondents correctly identifying the local transit agency increased from 43 percent during the benchmark phase to 48 percent after the first campaign and 52 percent after the second marketing program. The percentage of respondents supporting the importance of transit as a community issue dropped from the first wave, although it was still slightly above the benchmark results.

Once again there was no significant change in the proportion of respondents making use of transit after the second phase, although there was an increase in the 18 to 34 and the 55 and over age groups. Changes in riding frequency were not reported after the second phase, but ridership figures from the individual systems indicated a 10 percent ridership increase regionwide from June 1996 to June 1997, as indicated in Table 11-18. Table 11-18 gives month-by-month revenue ridership changes for each system separately and in total, and highlights the timing of both the second phase marketing and known external events.

Table 11-18 Southeast Wisconsin Revenue Transit Passengers as Related to Promotion

Month	Marketing and External Events	Percent Change in Ridership, 1997 Versus 1996				
		Milwaukee	Waukesha	Racine	Kenosha	Region
January	Fares higher in 1997 in Racine	1.2%	-0.5%	-19.5%	-5.5%	0.3%
February		-0.6	3.6	-18.3	-2.1	-1.3
March		1.2	1.1	-16.7	-2.9	0.4
April	I-94 resurfacing; extra service [a]	4.4	14.0	-16.4	7.8	3.8
May	April 25 to May 15 Promotion	2.4	9.5	-8.2	0.9	2.1
June		10.8	29.4	-13.2	10.9	10.2
July		5.0	31.2	-12.3	5.2	4.7
August		7.6	13.5	-17.1	-6.6	6.6
September		5.7	8.3	n/a	n/a	n/a

Note: [a] Resurfacing of I-94 in early April, and the extra bus service added as a mitigation measure, affected only Milwaukee and Waukesha.

More… A number of conclusions were noted in the marketing study. The image (first) campaign had a lesser effect on ridership numbers than the ridership campaign, while the image campaign had a greater effect on most attitudes. Advertising recall was better after the ridership campaign (62 percent versus roughly 50 percent for the image campaign). Ridership increases and the higher rating of the importance of transit as a community issue dropped off at the end of both phases; this was taken to indicate need for ongoing marketing efforts.

Sources. Northwest Research Group, Inc., "Southeast Wisconsin Research and Marketing Initiative: Final Report." Milwaukee (1998). • Bush, S. J., Division of Transportation Investment Management, Wisconsin DOT. Letter to the authors with attachment, *Revenue Passengers* (June 17, 1998).

Green Line Reopening Marketing Campaign in Chicago

Situation. Service on the Chicago Transit Authority (CTA) Green Line rail rapid transit in Chicago was reinitiated in the spring of 1996 after two years of closure. The Green Line serves the west and south side of Chicago, linking the Oak Park/River Forest neighborhoods to the west and the Jackson Park and Englewood neighborhoods to the south with Downtown Chicago. Reconstruction during service closure included rail infrastructure and station upgrading, and service levels were improved upon reopening.

Actions. The CTA conducted a major marketing campaign prior to the reopening of the line and during the initial phase of re-instituted service. Promotional elements included television advertisements, newspaper advertisements, newspaper stories, billboards, and information at Green Line train stations, other CTA train stations, inside CTA buses, and on CTA trains.

Analysis. The effectiveness of the marketing campaign was evaluated through two surveys: a Green Line station rider survey focused on rider travel characteristics, and a Green Line market area traveler survey. The market area survey used a random-digit-dial (RDD) telephone sample stratified by the west and south market areas, with oversampling of Green

Line riders. It included questions on advertisement recall and influence, possible future use by non-riders, and factors that might encourage increased ridership. Only the market area survey findings, which focused more on marketing campaign results, are reported here.

Results. The market area survey findings indicated that the marketing efforts were successful in raising awareness about the Green Line service reintroduction. Overall, 86 percent of the non-rider service area respondents were aware of the Green Line. For some travel markets, however, such as trips to destinations outside the service area and CBD, awareness of the Green Line was lower, ranging from 40 to 60 percent. Table 11-19 lists the sources riders and non-riders gave for obtaining information on the Green Line, and provides percentages for each source. Multiple responses were allowed to the questions. Television was the most frequent source of awareness of the Green Line.

Table 11-19 Marketing Sources of Awareness of the Reopened Green Line

Source of Information about the Green Line	Riders	Non-Riders
Television	39%	34%
Newspaper accounts	28	21
Billboards	26	20
Green Line train stations	19	21
Other CTA train stations	19	11
Inside CTA buses	17	—
CTA Trains	15	16
Newspaper advertisements	15	11
Radio	—	10

Thirty-nine percent of riders and 30 percent of non-riders recalled a theme from the Green Line promotional campaign. Twenty-seven percent of the riders and 22 percent of the non-riders recalled the *Go Green Line* advertising theme. Other individual themes associated with the campaign were noted by only 3 percent or less of the respondents in both groups.

Twenty-six percent of riders recalling a Green Line marketing theme, or approximately 10 percent of all riders, indicated the advertisement positively influenced them to increase use of the Line. Thirty-five percent said the ad did not increase their ridership, but did make them feel more positive about Green Line riding. Thirty-six percent indicated the advertisement had no negative or positive impact. Overall, the ads had a positive influence on 61 percent of the riders recalling them, accounting for approximately 24 percent of Green Line riders.

Of the non-riders, 6 percent who recalled an advertisement said the ad positively influenced them to increase use of the Green Line, while 34 percent indicated the ad did not increase their use but did make them feel more positive about riding, and 51 percent reported no positive or negative influence. Overall, the promotional advertisements had a positive effect on 40 percent of the non-riders recalling the ads, or approximately 13 percent of the market area non-riders.

The characteristics of riders and non-riders who remembered the advertisements and those who did not were explored. Non-riders who did not remember any of the advertising themes were more likely to have received their information from newspaper ads. Non-riders indicating they were very likely to use the Green Line in the future were about as likely as riders to have heard about the Green Line from television, and were as likely to be able to remember the *Go Green Line* theme. Both riders and non-riders who reported hearing about the Green Line from television and those who remembered the *Go Green Line* theme were more likely to be under 34 years of age.

More… Both riders and non-riders were asked a series of trade-off questions to identify incentives that would encourage greater Green Line use. The paired-comparison method was employed with these questions. Results are provided in Table 11-20. "Always getting to my destination on time" was rated most important by a large margin by both riders and non-riders, while "if a schedule or map was mailed to my home" was rated least important.

Table 11-20 Trade-Off Analysis Results Covering Features Likely to Increase Use

	Point on Trade-Off Analysis Scale	
Incentives Deemed Likely to Increase Green Line Use	**Riders**	**Non-Riders**
Always getting to my destination on time	+10.0	+6.0
Less wait time for transfers	+2.3	+3.7
Temperature on the train always comfortable	+1.4	—
If I knew I'd get to my destination in same or less time	—	+4.2
If there were video monitors at most stations	-0.8	-0.4
If the trains and stations were clean	—	-3.7
Ticket booth/train personnel more courteous/helpful	-3.0	-4.8
Better signage at stations	-5.5	—
If a schedule or map were mailed to my home	-5.8	-5.4

Finally, 50 percent of riders indicated they were very satisfied with the Green Line service, while 38 percent reported being somewhat satisfied, totaling 88 percent very or somewhat satisfied. Ten percent reported they were somewhat dissatisfied and only 1 percent indicated there were very dissatisfied with the Green Line service.

Source. Chicago Transit Authority, "1996 Green Line Corridors Household Travel Survey." Chicago, IL (August, 1997).

Individualized Transit Marketing in Europe

Situation. Research in the 1990s showed that while the public's attitude in European cities toward public transportation was favorable, it was not well reflected in their travel behavior. The International Union of Public Transport, in response, fostered the development of an innovative marketing approach, called *Individualized Marketing*, to help increase actual system ridership through personalized motivation, information and convincing. The program has been tested, applied and demonstrated in over 40 European cities. Information on two test cases in Kassel and Nürnberg, Germany, along with 7 large-scale applications also in

Germany, and 27 completed demonstrations throughout Europe, is provided here. Other large-scale applications and demonstrations are underway.

Actions. The approach to individualized marketing differed among test cases, applications and demonstration sites. The generalized approach is to start with a screening of the selected population, during which households were contacted and divided into three groups, collectively labeled the Target Group. The percentages accompanying the group descriptions given here indicate proportions within the overall Target Group, and are simple averages for the 7 large scale applications in Germany:

- Group R – Regular users of transit service (25 percent). They may be awarded a small gift or incentive to "confirm" them in their behavior. They are offered information, and separated into "with" and "without" subgroups desiring or not desiring it, respectively.

- Group I – Non-regular users who acknowledge interest in individualized contact and are not constrained by lack of appropriate transit service or other circumstances from using transit (38 percent). This group is targeted for direct contact.

- Group N – Uninterested persons, or more precisely, persons who do not fit within either Group R or Group I (37 percent). Group N persons are excluded from further marketing involvement.

Group I is then further contacted by telephone, or if requested, by means of home visits, for what has been termed the "convincing" phase. Information is provided about options, often accompanied by a "test ticket" good for free rides for various lengths of time up to 1 month. Information is likewise provided to the Group R "with" subcategory of regular transit users, sometimes with a small reward, but not with free rides.

The first tests of the individualized marketing approach were conducted in Kassel in 1991 and Nürnberg in 1993. The Kassel project included using consultancy staff to directly contact potential users of public transit, providing them with information about available services, and giving them a free monthly pass. In the Nürnberg test, transit agency staff conducted home visits with potential riders and provided free tickets to selected households. This approach is more typical of subsequent applications and demonstrations, although in a number of the pan-European demonstrations, the followup was via direct mail instead of by direct contact. Those mostly turned out to be lower-performing demonstrations.

Analysis. Most of the test and demonstration applications were considered to be experimental, and involved a sample population of a few hundred households. The seven large-scale applications, however, covered an average of 35,000 households. Each application was monitored and evaluated. The results summarized here cover all of Groups R, I and N as described above, except for findings from the pan-European demonstrations, where in countries outside of Germany and Austria, Group N was excluded from the evaluation. In all cases, persons refusing to be questioned in the selection phase (averaging 27 percent in the large scale applications) were excluded in calculating program effects.

The test populations were not necessarily typical of the metropolitan areas involved. Some number of the tests focused on suburban areas with good transit service but relatively weak transit riding, or other markets thought particularly amenable to the marketing effort. (This may in fact make the results of more interest to North America than if they had been truly representative of the test site European cities.) Control Groups of persons not included in the

marketing effort were established for statistical control, providing a basis for estimating marketing effects separate from effects of transit service improvements.

Results. The results from the seven large-scale applications of individualized marketing in Germany provide probably the best indication of mass-application program potential with close adherence to the approach developed by UITP and Socialdata. Also, breakdowns are available by the individual target subgroups, as summarized in Table 11-21. In cities with no significant alterations to the transit system, annual transit trips per person in the overall target groups went from 184 to 199 (up 15 percent) while in the control groups they declined slightly from 181 to 178 (down 3 percent). In cities where significant transit improvements occurred between the before and after periods, annual transit trips per person in the overall target groups went from 142 to 185 (up 43 percent) while in the control groups they changed from 134 to 152 (up 18 percent). The experience from those cities led to a conclusion that positive effects on transit ridership of service improvements can be doubled by undertaking individualized marketing in parallel.

Table 11-21 Individualized Marketing Effects on Annual Transit Trips per Person by Target Subgroup in Seven Large Scale German Applications

Group	No Alteration in Transit System		Improvements to Transit System		All Systems with Data Available	
	After Trips	Change in Trips	After Trips	Change in Trips	After Trips	Change in Trips
Control Group	178 [a]	-3	152 [b]	+18	159 [a+b]	+12
Target Group	199 [a]	+15	185 [b]	+43	189 [a+b]	+35
Group I (Interested non-regular users)	129 [c]	+17	234 [d]	+97	208 [c+d]	+76
Group R (Regular users, added info) [e]	388 [c]	+30	323 [d]	+102	339 [c+d]	+84
Group R (Regular users, no added info)	280 [c]	+9	256 [d]	+39	262 [c+d]	+32
Group N (Constrained or not interested)	73 [c]	-2	152 [d]	+23	133 [c+d]	+17

Notes: Groups I, R and N are subgroups of the Target Group. For expanded subgroup definitions and explanations, see the "Actions" discussion above.

Values given are averages for the systems with data available. Subgroup data was not available for all systems, therefore the subgroup values may be compared against each other but not against the Target Group as a whole or the Control Group.

For Hannover, Control Group results are based on the whole city.

[a] Wiesbaden and Stuttgart-Freiberg.

[b] Nürnberg, Hannover-Südstadt, Vellmar, Baunatal and Kassel.

[c] Stuttgart only.

[d] Nürnberg, Hannover and Vellmar only.

[e] Constitutes 52% of Group R for cities both with and without transit system improvements.

Examination of the annual transit trips per capita results in Table 11-21 for the individual subgroups of the Target Group indicate that both interested non-regular users (Group I) and regular users (Group R) were important to the increased transit ridership resulting from the individualized marketing. For the two cities with no significant alteration to the transit system, the proportions in Groups I, R and N were 18, 43 and 39 percent, respectively, while for the five cities with transit improvements, the proportions were 31, 27 and 42 percent, respectively. These percentages are simple averages. Within Group R, the regular users, 52 percent were in the category requesting additional information and 48 percent did not accept the offer of more information beyond that provided in the initial contact.

In the cities where no significant transit improvements took place, the transit mode shares increased from 19 to 21 percent for the Target Group, and stayed at 19 percent for the Control Group. In the cities with transit improvements, Target Group transit shares rose from 15 to 19 percent, while Control Group transit shares went from 14 to 15 percent. The proportions of Target Group persons using transit at least once a day increased by 3 percentage points in both categories of cities, as did the Control Group proportion using transit in cities with transit service improvements. The greater ridership gain for Target Group members in cities with service improvements apparently came primarily from increased riding frequency, but overall, transit trips per transit user per day did not change much. The lower riding frequency of new transit riders apparently diluted the frequency increase for regular users, but not with any detriment to the overall positive impact.

In contrast, substantial increases in both the proportions of test group persons using transit at least once a day and in the frequency of transit riding occurred in the initial test cases. These results are presented in Table 11-22. In the Nürnberg test, the transit mode share among participants rose from 14 percent before the marketing to 23 percent after, an increase of 64 percent. The use of transit among test group participants in Kassel more than doubled, with the transit mode share increasing from 8 percent to 17 percent.

Table 11-22 Use of Public Transport Before and After Individualized Marketing in Nürnberg and Kassel Test Applications

	Nürnberg					Kassel				
			Test Group					Test Group		
Measure	City Total (1992)	City Total (1995)	Before (1992)	1 Year After (1994)	2 Years After (1995)	City Total (1991)	City Total (1994)	Before (1991)	1 Year After (1992)	4 Years After (1995)
Transit Trips per Person per Year	201	211	178	321	276	167	174	92	198	198
Percent of All Persons Using Transit	23%	25%	24%	33%	33%	19%	20%	19%	29%	30%
Transit Trips per Transit User per Day	2.5	2.5	2.2	2.9	2.4	2.6	2.6	1.4	2.0	1.9

Additional test case findings were provided within the "Related Information and Impacts" section. Mode share data was given in Table 11-16 under "Mode Shifts and Impact Decay." The relatively long term sustention of heightened public transport use exhibited by test group participants is also discussed in the same subsection. Differential test population ridership

increases among trip purpose categories and before and after transit trip purpose percentages were covered in Table 11-17 within the "Peak Versus Off-Peak Ridership Effects" subsection. A cost/benefit assessment building upon the test case and large scale application findings, and indicating that the individualized marketing approach is cost-effective, is reported on in the "Effectiveness and Benefit/Cost Findings" subsection under "Costs and Benefits of Promotion."

More... The results for the seven large scale applications in Germany also provide data on changes in satisfaction with public transport, which were found to have occurred in parallel with the individualized marketing. High increases in transit riding were associated with both high and medium increases in the study's satisfaction index, as were medium increases in transit riding. Overall, an increase in transit trips per person per year of +23 trips was accompanied by a corresponding increase in the satisfaction index of +21 points (simple seven-system averages). Note that these increases are adjusted against Control Group responses, for example, the +23 trip change in transit trips equates to the Target Group change in Table 11-22 of +35 less the Control Group change of +12. Since the satisfaction index could not go over 100 — it was constructed as percent satisfied less percent unsatisfied — the percentage increase in satisfaction was actually considerably greater than the percentage increase in transit riding.

The pan-European demonstrations encompassed a variety of individualized marketing approaches, and encountered evaluation inconsistencies. In the 27 completed projects, the average reported results for the targeted participants were a 4 percentage point change in transit mode share (from 17 to 21 percent) and an increase in annual transit trips per person of +32 (from 164 to 196). Demonstrations that employed a face-to-face individualized marketing approach achieved an average increase in annual transit trips per targeted person of +37. Those few that employed a direct mail approach averaged an increase of +20 trips per year. The demonstrations using a differentiated approach of concentrating on the most promising individuals among targeted participants, similar to the large scale German applications, obtained an average increase of +33 transit trips per person per year. Almost all of the latter demonstrations were in Germany, where a more conservative evaluation method was employed, thus the differentiated approach may actually have done as well as the blanket face-to-face approach.

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