design standards and accessibility: How much do volumes actually vary with variations in these characteristics? How much do they vary with climate? Are the effects of weather similar in different regions? Are cyclists in Seattle as discouraged by light rain as those in Boston? Is the rate of increase of commuter cycling in Boston applicable nationally or dependent on such local factors as present cycling volumes, transit fares, and highway congestion?

A particular and important question is, What are the relationships between bicycle volumes and accident frequency by time of day, day of the week, and month of the year? Information on this would both improve our understanding of the causes of accidents and expand the usefulness of the data on bicycle-traffic volumes that have been and will be collected.

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Acceptance of Policies to Encourage Cycling

WERNER BRÖG

Research in the Federal Republic of Germany has rarely dealt with nonmotorized traffic. This applies to the collection of reliable behavioral data as well as to the application of these data in suitable planning models to forecast possible behavioral changes. Too little is known about the population's acceptance of such planning policies. Due to this lack of information, we can only guess about the effect of specific policies. But more important, since so little information is available, it is impossible to gear such policies to the needs, wishes, and interests of the persons affected by the policies. Thus, in order to encourage bicycle use in communities that have a medium or small population, many integrated measures must be used, and there are major differences of opinion concerning the concrete individual parts of such a bundle of measures and the effect of each specific measure. Frequently, attempts to solve this problem apply those instruments used by public opinion researchers. This paper wishes to demonstrate that this demoscopic approach is not suitable to deal with the topic discussed here. The paper presents an alternative approach to solve the problem—an approach that has the advantage of combining model design with estimates regarding the acceptance of different measures and deals with both in one concept—the situational approach. It can be shown that a whole series of measures must be integrated in planning if we wish that policies that encourage cycling be accepted so that more persons change to bicycles. Construction or extension of the bicycle infrastructure is of secondary importance, although important to stabilize those persons who have changed to the use of bicycles.

The bicycle is the healthiest and most ecologically oriented mode of transportation. However, although a number of cities in the Federal Republic of Germany have taken steps to encourage bicycle travel, the situation for cyclists is generally not particularly favorable. Therefore, the Federal Environmental Office decided to sponsor a model project called A Town for Cyclists (1) for towns that have a population of 30 000-100 000.

The model project will be concerned with the construction of a cycling infrastructure for all travel with person-powered vehicles (2). All cities included in the project will be involved in an intensive exchange of information. Planning seminars will be held to pass on knowledge and to share experiences with other participants. When the project is completed, the results will be evaluated and guidelines for planning will be made available to other cities (3).

Information concerning the quantity and quality of nonmotorized travel and measures to encourage such travel can be greatly improved by this model project; however, present knowledge concerning the acceptance of such measures by the populace is still limited. A more-precise analysis of a study on potential that has just been completed (4) can be of help here.

CONCEPT OF THE STUDY ON POTENTIAL

The study on potential was done in communities that had a population of 80 000 or less. Data were collected for three areas in the Federal Republic of Germany--one had a good, one a medium, and one a poor cycling infrastructure (5). The survey was done in two steps. In the first step, present travel behavior was determined on a specific sampling day in the spring of 1980 for the population surveyed. Of all trips made on this day, 16.4 percent were by bicycle. The percentage of individualized modes of transportation, which was 55 percent in the survey on potential, was extraordinarily high. As a result, the percentage of persons who use public transit was only 6 percent. This was due to the size of the communities selected to be included in the survey. Also note that, in selecting persons for inclusion in the survey, middle-aged persons were given preference and immobile persons were partly excluded. This survey was a pilot study and dealt primarily with persons who might use bicycles rather than with persons (e.g., elderly or immobile persons) who are unlikely to use bicycles. The second part of the survey dealt with the 84 percent of the trips that had not been made by bicycle on the day of sampling. The reasons why bicycles were not used were studied in intensive interviews in which all of the household members were present. Interactive measurement methods were used (6).

As a first step in the analysis, all those trips made with other modes were excluded if the one-way distance to the destination was more than 15 km. For these trips (a total of 24 percent), cycling would be a feasible alternative only in borderline cases. Given the conditions on the day of sampling, only 3 percent of the trips made could have been made by bicycle. Two-thirds of the trips made on the sampling day were restricted to the mode actually used on that day; due to constraints, it would have been impossible to use a bicycle (7).

The size of this group that has the option of

using a bicycle on the sampling day increases from 3 to 30 percent when the restrictions on the day of sampling are eliminated. But, for the status quo conditions, this shows certain limits that should put a damper on too optimistic expectations.

If potential is thus determined, the results of demoscopic surveys will be viewed with scepticism. Demoscopic surveys assume a direct relation between stated opinions and actual behavior. However, generally, this is not so (8). Ninety-five percent of the interviewed mobile persons claimed, for instance, that they would be happy if their towns were to participate in a town for cyclists so that the bicycle network might be extended (44 percent). However, only 66 percent of the persons interviewed thought that riding bicycles had certain advantages.

On the other hand, a more in-depth analysis showed that only 49 percent of the persons interviewed who do not ride bicycles are honestly probicycle; the rest simply claimed to be in favor of bicycles. The present maximum potential for persons to change their modes in favor of bicycles is, as has already been mentioned, 30 percent--a respectable figure but considerably less than the demoscopically determined values.

In the project quoted above, the likelihood that persons would change from public transportation to the bicycle was the greatest and least likely was that persons would change from the use of cars to the use of bicycles. This insight is important, for if one assumes that towns are probably not particularly eager to lose their public transit passengers and if one remembers that one reason for encouraging cycling is to reduce congestion caused by cars, then it is obvious that, if potential is not reliably determined, the use of bicycles might well rapidly increase but the increase might be at the cost of the wrong mode.

This means that important measures to increase bicycle use might possibly, in light of traffic congestion caused by cars, apply restrictive measures to car use. Because such restrictive measures were probably not considered by the persons interviewed, they might lead to a rapid change in public opinion. However, a sensibly executed simultaneous study could identify these negative processes before it is too late and counteract them with appropriate measures.

Therefore, when attempting to determine the acceptance of such measures, it is of utmost importance not to simply rely on stated opinions. Rather, the estimate of likely behavioral reactions is a much more reliable way to identify the acceptance of planning policies.

PROBLEMS OF EMPIRICALLY MEASURING POSSIBLE CHANGES IN BEHAVIOR

The use of demoscopic measurement methods is problematical when estimating possible changes in behavior. Alternative research concepts have been developed in the meantime and their application has already been tested. So-called situational analysis (9) is an alternative of this sort.

Beside a new model philosophy (10), such an approach requires empirical data of a particular quality. In order to acquire such data, a combination of different measurement methods must be used, whereby the qualitative methods, especially, must fulfill certain requirements. However, new methodological advances have been made in this area--the so-called interactive measurement methods.

By using these measurement methods, the areas of information that are important here can be covered and the necessary data can be collected:

Data	Description
Basic descriptive	Sociodemographic characteristics of individuals and their households, complete description of all transportation modes available in the households, detailed information on all bicycles present within household
Behavior descriptive	Complete activity patterns of all household members for specific, defined periods of time (including choice of routes); general activity budget of household members for specific periods of time; general action radii of household members
Contextual	Division of chores and duties within household and possibility of changing the internal household organization, objective and subjective availability of vehicles in general and for those activities that have actually taken place, options and constraints that allow for or exclude use of bicycles
Explanatory	Behavior can be explained as the result of individual's subjective interpretation of experience, perception, orientation, attitude, and reaction
Experiential	Basic experiences with alternative modes, concrete experience with alternative modes for activities that have already taken place, specific experiences with bicycle for different activities and destinations
Perceptive	Perception of individual situation, cycling infrastructure, bicycle's characteristics, and riding bicycles
Orientational	Influence of general values on behavior, influence of peer group, dominance of particular household members
Attitudinal	Subjective willingness to use bicycle in general and for particular activities, subjective experiences with bicycles, prestige value of riding bicycles
Reactional	Possibility of reorganization of individual activity patterns so that bicycles can be increasingly used given present conditions, working out ways of increasing extent to which activities can be thus reorganized, reorganization of individual activity patterns when external conditions have been thus changed

By using these types of data (after the data have been adequately coded), one can estimate how large

the present potential for bicycle use is relatively accurately and with which measures this potential can or cannot be attained. The much more common variation of the (demoscopic) what if... questions, however, cannot attain this goal.

However, this comprehensive data requirement plan and its relatively complicated survey technology may leave one with the impression that it is exaggerated. This impression would not do justice to a major aspect of such research concepts. If alternative transport planning wishes to adapt itself better to the wishes and needs of the affected population, then it must also use those research methods that have the same goal (11). "Reality exists for empirical science only in the empirical world, can only be sought there, and can only be verified there" (12).

This goal, however, cannot be attained with empirical concepts that interpret surveys as a stimulus-reaction mechanism. Rather, explorative and interactive measurement methods must be used in addition to quantitative measurement methods. Such a "qualitative methodology favors an approach to study the empirical social world that demands that the researcher interpret the real world from the perspective of the subject being studied" (13).

USE OF SITUATIONAL APPROACH TO DETERMINE POTENTIAL FOR CHANGE

The majority of mobile persons are basically free to use bicycles if they wish. That they do not do so is caused, to a large extent, by their personal attitudes toward the use of bicycles. This insight clearly shows the limitations of forecasting mode split with conventional methods. Forecasting models that have been used in transport planning up until now are not able to depict subjective attitudes and possible changes adequately.

An approach is needed that is oriented to the individual and in which specific out-of-house activities are grouped into activity patterns. These activity patterns are reflected in the situational context of the given households. Combined with the household-oriented activity pattern, substitution, reorganization, and flexibility can broaden the approach considerably (14). When this approach is used, travel behavior can be better understood and explained.

Because transportation planners need information that deals with trips, the basic unit of a model for mode choice must be the specific trip made by the individual. These trips should not be viewed in isolation but should always be seen in their relation to trip chains, activity patterns, and the activity programs of the individuals and their households (15). The trips are not made in a vacuum. Environmental conditions influence the realization of the trips, the trips chains, activity patterns, and activity programs. However, if out-of-house mobility is viewed as a derived demand, then the activity programs also limit the situational context for this mobility, which must be included in a pertinent model-like depiction. If one wishes to understand mobility in relation to the above, then all the factors must be identified that determine behavior in these situational contexts. A simple use of sociodemographic variables is insufficient even if these variables are seen in relation to some characteristics of the existing infrastructure (16).

Note that persons do not perceive their situational contexts as they objectively exist (10). But, since subjectively experienced situations determine behavior, a realistic model must also include subjectively perceived variables. This means that, in every single instance, one must investigate how the given macrostructure is reflected in the microstructure of the pertinent individuals. Therefore, perception is one of the keys to relate macrostructure to microstructure. However, these mechanisms of perception have not yet been studied comprehensively enough to explain them sufficiently.

If one wishes to explain observed (mobility) behavior, it is necessary to classify the given subjective behavioral situations into dimensions that determine behavior. However, since the reasons that cause out-of-house mobility are highly complex (11), different dimensions must be selected to take the feasibility of their application into consideration. It seems that five dimensions are sufficient to determine bicycle potential (7):

Dimension	Description
Option of using bicycle	Bicycle available, trip <15 km
Constraints against using bicycle or requiring use of specific mode	Transport of baggage, weather conditions, health, car needed at work
Perception of route	No bicycle paths, too many hills, dangerous intersections
Perception of riding bicycle and time required	Too slow, too tiring, clothes get dirty
Subjective willingness	Willing to use bicycle mode

General behavior, as well as decisionmaking pertaining to modal choice, are not constant. This means that behavior observed on one day will not necessarily be repeated on the next day. The solution usually used for this problem (i.e., to collect information on relevant variables over a period of time) is costly and methodologically very difficult. If the latter problem is perhaps even more important than the prior, it is rarely considered. Sensitization (17), which was developed for use in the situational approach, offers an alternative that is of almost equal value. By defining threshhold groups, those trips in each dimension can be identified for which the factors that determine mode choice are temporally variable: Observed behavior is generalized.

An aggregate evaluation of these dimensions for all trips that were not made by bicycle (in the study on potential) results in the observed behavior on the day of sampling and the generalization of this behavior that is depicted in Table 1.

Such an approach is only possible if each case is considered individually and remains an independent unit of action in modeling. This is important because the individual interrelation of the different categories and threshhold values are what make possible identification of those options that are actually open to persons. An individualized approach of this sort also makes it possible to identify persons who have comparable decisionmaking situations. These decisionmaking situations are the first key to aggregation, which is naturally also necessary in this type of model approach.

Situational groups are the basis for this type of aggregation. Note that situational groups and situational contexts are comparable; they classify trip categories not persons. Situational groups are deterministic (i.e., behavior of persons in these groups is predetermined) if they do not permit certain types of behavior due to specific conditions, whether or not individuals in the groups wish to realize a particular behavior for their trips. In the area of mode choice, most of the situational

Table 1. Dimensions pertaining to use of bicycle.

Dimension	Behavior Observed on Day of Sampling (%)		General Behavior (%)	
	No	Yes	No	Yes
Option of using a bicycle	14	86	11	89
Constraints make bicycle use possible	70	30	41	59
Due to perception of route, bicycle is acceptable	20	80	14	86
Due to perception of characteristics of bicycle itself and time needed to travel by bicycle, bicycle is acceptable	43	57	29	71
Subjective willingness to use bicycle	81	19	51	49

Note: Only trips of less than 15 km not made by bicycle were considered.

groups are determined either by objective reasons (no alternative), personal reasons (car needed at work), or by subjective reasons (persons are insufficiently informed or have subjective aversions to certain modes). But usually, a smaller number of trips remains for which use of an alternative mode is subjectively as well as objectively possible. This situational group (group with options) defines the maximum potential for changed behavior given status quo conditions.

From an aggregate point of view, one could have assumed that almost every other trip previously not made by bicycle could be a potential bicycle trip due to the positive attitude of the respondents (this is similar to the demoscopic approach that is criticized in this paper), an individualization of general options shows that the present potential (i.e., without the implementation of any new policies) is actually much smaller (Figure 1).

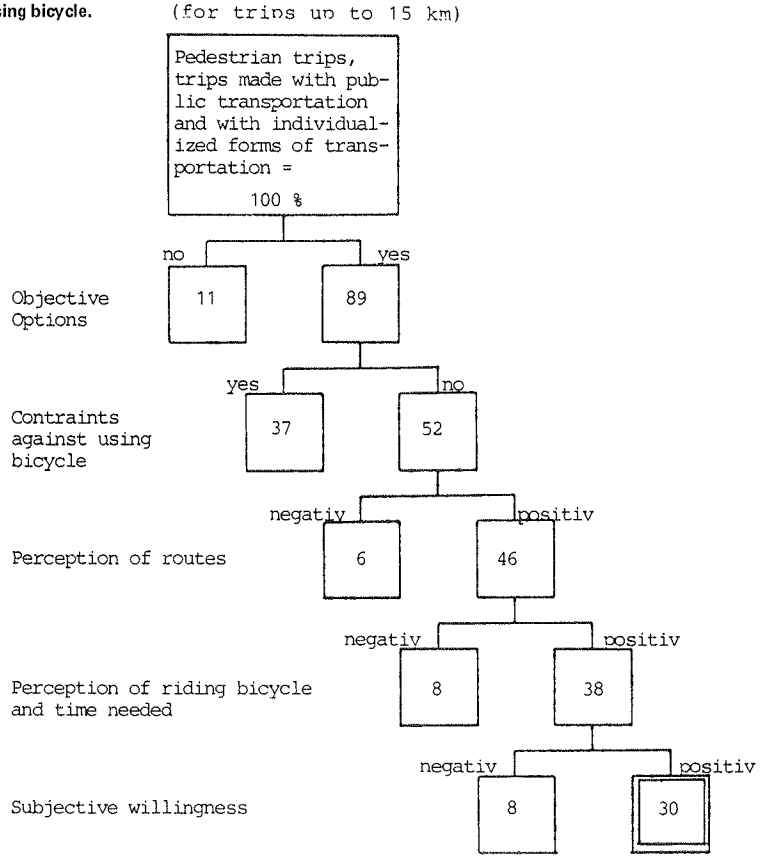
According to this categorization, which results from the individual combination of the five dimensions, one can differentiate six situational groups, which are characterized by Roman numerals. Groups I-V have a deterministic character given the (generalized) status quo conditions; only situational group VI has the unlimited option of using bicycles given existing conditions.

In this approach, individual (behavioral) situations are seen as factors that influence individual options and constraints. This approach is also based on the insight, however, that individual mode choice follows a unique, subjective logic that is frequently at odds with the researcher's, planner's, or politician's more or less externally imposed rationality. This does not mean that the individual's choice of mode is not rational but that it is subjectively rational. The regularities of this subjective rationality are naturally manifold and have not yet been studied comprehensively (10).

If one analyzes mode split by using the situational approach, then one can differentiate between three types of mode use:

1. Persons who cannot change to an alternative mode due to objective conditions or due to constraints that can be changed only with great difficulty (situational groups I and II);
2. Persons who are basically able to use another mode but do not do so due to inadequate information about the mode, poor perception of, or a negative attitude toward the mode; thus, the mode is not subjectively an option open to them (situational groups III, IV, and V); and

Figure 1. General options of using bicycle.



3. Persons who view the alternative as subjectively possible yet do not use it (situational group VI).

The sizes of these groups vary greatly according to mode and to the specific spatial and infrastructural conditions. However, the potentials presented in this paper give one an idea of the acceptance of measures to encourage the use of bicycles.

ESTIMATING DEGREE TO WHICH DIFFERENT MEASURES TO ENCOURAGE CYCLING ARE ACCEPTED

The situational groups also give a structural base with which to work out planning measures and to estimate the effects of these measures. This is possible because the value of all of the dimensions is determined for each trip. If, for example, the use of the bicycle is not possible for a specific trip that has been made by car because the household did not have a bicycle, an additional check was made to see if there were other constraints that also necessitated use of the car. This makes it possible to identify those car drivers whose transportation options would not have been increased even if bicycles had been available.

Measures directly affect only the external situation and can affect the resulting behavior only indirectly. An approach of this sort makes it possible to identify those situations for which a change is theoretically possible if certain measures are implemented--or to put it more concretely, which of the trips made by a specific situational group whose mode choice is of a deterministic character can be included in the group that has options. The step required here, the so-called dynamization (17), tells one the size of the maximum potential for reaction to a planning measure that is to be studied.

The inclusion of a trip in the group that has options only means, however, that a change of mode is possible, not that it will actually occur. In order to estimate the likely reactions to a measure, it is necessary to determine the given responsiveness for the trips included in the group that has options. This step of the study combines probabilistic elements in the basic model structure with the deterministic elements that have already been discussed. However, the probability that certain reactions will occur, which are determined with this approach, are based on the subjective rationality of the actors and cannot be compared with the utility function of an econometric approach, for instance.

The structuralization of the individual (decisionmaking) situations offers one the possibility to determine the likely potentials for different areas of measures and thus, the acceptance of measures in these areas. The different areas of measures are identical with the five dimensions and, in relation to possible measures, they can be roughly formulated as follows:

1. Objective option--basic availability of bicycles (e.g., making it possible to rent bicycles);
2. Constraints--only constraints that pertain to the bicycle itself (baggage transport needed, weather conditions) are referred to here, since other constraints (passengers, car needed at work, complex trip chains) cannot be dealt with by the measures discussed in this paper;
3. Routes--improvement of the bicycle infrastructure;
4. Riding bicycles--public relations work geared to clarifying misconceptions and incorrect perceptions; and
5. Subjective willingness--increase the number of persons willing to change to use of bicycles by creating a climate of opinion in the community that is favorably disposed to bicycles.

For each of these areas of measures, we can determine the maximum potential for change, which is the upper limit for possible reactions when all of the necessary measures have been adapted (from the point of view of the individuals affected) in this area (Table 2). However, this upper limit is a theoretical value that will never, in fact, be attained. Those reactions that are actually to be expected can be estimated by using the responsiveness coefficients that are determined interactively. This coefficient shows how high the percentage of likely mode change is from the given potential.

When determining the number of persons who react, we should not forget that the values in percentages of the given potentials only pertain to a limited group of travelers (i.e., nonbicycle trips of 15 km or less). For this reason, the potentials in Table 2 are also calculated for all trips (including bicycle trips); with the help of the responsiveness coefficients, the behavioral changes were determined (as a percentage of all trips).

This calculation, which is of great value for forecasting, serves here, however, as the basis for estimating the acceptance of measures. An acceptance index was established for this purpose. It relates the bicycle use that can be expected when a policy has been introduced to the present share of bicycle trips. The present share of 16.4 percent was set equal to 1.00. An acceptance index of 2.00 would then mean that twice as many persons would use bicycles, and an acceptance index of 1.00 would indicate that no change had taken place (Table 2).

The different acceptance indexes show that, even if no new measures are adapted, an increase in cycling would still occur. This is because the current climate of opinion in Germany is probicycle. Due to further developments since the study was done

Table 2. Maximum potential and acceptance of different measures.

Areas of Measure	Potential A: In Relation to All Other Modes ≤ 15 km (%)	Potential A: Responsiveness Coefficient[a]	Potential B: In Relation to All Trips With All Modes (%)	Potential B: Likely Reactions (%)	Potential B: Acceptance Index[b]
Status quo[c]	30	0.03	18	0.5	1.03
Bicycle availability	32	0.13	19	2.5	1.15
Bicycle constraints	34	0.21	20	4.2	1.26
Infrastructure	34	0.14	20	2.8	1.17
Public relations work to clarify misconceptions	33	0.16	20	3.1	1.19
Community climate	38	0.14	23	3.2	1.20

[a] Percentage of likely responses from potential A.
[b] Likely reactions to potential B in relation to present bicycle share (16.4 percent = 1.00).
[c] Status quo included in the following areas of measure.

Table 3. Maximum potential and acceptance of different measures when climate of opinion in community is positive.

Areas of Measure in Combination with Positive Climate of Opinion[a]	Potential A		Potential B		
	In Relation to All Other Modes ≤ 15 km (%)	Responsiveness Coefficient[b]	In Relation to All Trips With All Modes (%)	Likely Reactions (%)	Acceptance Index[c]
Bicycle availability	42	0.27	25	6.7	1.41
Bicycle constraints (baggage, weather)	56	0.25	33	8.3	1.51
Infrastructure	43	0.23	26	5.9	1.36
Public relations work to clarify misconceptions	46	0.30	27	8.2	1.50

[a]Measures assume that a positive climate of opinion exists. Status quo conditions are assumed in measures.
[b]Percentage of likely responses from potential A.
[c]Likely reactions to potential B in relation to the present bicycle share (16.4 percent = 1.00).

Table 4. Maximum potential and acceptance of different measures when their effects are viewed cumulatively.

Areas of Measure[a]	Potential A		Potential B		
	In Relation to All Other Modes ≤ 15 km (%)	Responsiveness Coefficient[b]	In Relation to All Trips With All Modes (%)	Likely Reactions (%)	Acceptance Index[c]
Status quo	30	0.03	18	0.5	1.03
Climate of opinion in community	38	0.14	23	3.2	1.20
Public relations work to clarify misconceptions	46	0.30	27	8.2	1.50
Infrastructure	52	0.35	31	10.8	1.66
Bicycle constraints	64	0.33	38	12.6	1.77
Availability of bicycle	73	0.32	43	13.9	1.85
Long-term effects on all other persons	100	0.24	60	14.3	1.87

[a]Each measure is cumulative and assumes the use of all preceding measures.
[b]Percentage of likely responses from potential A.
[c]Likely reactions to potential B in relation to the present bicycle share (16.4 percent = 1.00).

(especially since the price of gasoline keeps going up), one can assume that the current general acceptance of the bicycle will increase even more in the future.

The goal of well-considered community planning can no longer be to implement specific policies in isolation. Thus, the goal of the town for cyclists project is also to improve the climate of opinion in the communities in favor of cycling in order to increase the effectiveness of other measures. This concept can be demonstrated by using the figures available. If one wishes to pinpoint the acceptance of specific types of measures when combining them with positively influencing the climate of opinion within communities, then the potential grows considerably and the responsiveness, and thus the acceptance indexes, grow cumulatively (Table 3). Measures that deal with the bicycle itself (e.g., baggage-loading facilities and weather protection) and public relations work (clarification of misconceptions and correction of negative perceptions) are more important than improvements to the infrastructure.

However, one should be careful not to come to a false conclusion here. The responsiveness and acceptance of measures presented here deal with the possible use of the bicycle (i.e., with mode change). Irrespective of the fact that other aspects are not taken into consideration here (e.g., improvement of neighborhood quality), this does not mean that an improvement in the bicycle infrastructure does not also play an important, if not decisive, role in stabilizing the new potential of those persons who change mode. This becomes clear if one considers the cumulative effect of all of the different areas of measures (Table 4). This evaluation also shows that, in the towns studied (whose populations range from 50 000 to 80 000), almost three-fourths of all trips made by the mobile population (for the most part between 20 and 60 years of age) could possibly be made by bicycle. The share of trips made by bicycle could, at least in the long run, almost double. These upper limits, of course, cannot be attained or can only be attained over a longer period of time, given conditions as they are now. Previous experiences with comparable studies (18) show that almost half of this maximum potential can be attained, when appropriate measure are taken, in the not too distant future. For a town for cyclists project, this means that the acceptance index will be approximately 1.40. This acceptance index only pertains to the willingness to change mode if measures are taken to encourage cycling. A number of studies, however, have shown that a comparable effect could result (perhaps even more quickly) if restrictive measures pertaining to car use are taken. In this case, even in larger cities that have good public transportation, the number of car drivers who would change over to bicycles is about twice as large as the number of car drivers who would change over to public transportation (15).

CONCLUSIONS

The results of the situational analysis, the determination of potential, and the estimate of acceptance lead to the following conclusions:

1. A potential for the increased use of the bicycle can be recognized. This potential can be attained by implementation of specific measures.
2. This potential exists for all five of the different areas of measures. The spectrum of those measures that can achieve success is thus larger than has frequently been assumed.
3. Bicycles can frequently not be used due to several simultaneous constraints; thus, combined measures are particularly effective.
4. Bicycles are rarely not used only because persons perceive the bicycle infrastructure to be

inferior. Thus, when the infrastructure is improved but no other measures are instituted, the effect is minimal. However, when other measures are taken and the bicycle network is also improved, a considerable potential can be attained.

5. For many trips, bicycles cannot be used due to constraints. Improvements, especially weather protection and baggage-transport facilities, could make it possible for more persons to use bicycles. Thus, it would be worthwhile to work on improving the bicycles themselves.

6. Options are rarely solely affected by the fact that persons are unwilling to use bicycles. This means that a public relations campaign, in itself, will be of only limited value. Only when combined with other measures will a public relations campaign prove to be effective.

7. The largest potential can be found among those persons subjectively willing to use bicycles given status quo conditions. This group is subjectively and objectively in favor of bicycles but does not use them. Among this group, measures that restrict car use would be more effective than measures to encourage bicycle use.

All in all, the approach described above to determine the potential for reactions also offers one a usable, understandable, and methodologically valid approach to estimate the acceptance of measures to encourage bicycle use. This naturally also pertains to similar topics, especially those measures to reduce traffic (such as automobile-restricted lanes, pedestrian areas, and other similar efforts) that are currently so popular in the Federal Republic of Germany.

REFERENCES

1. K. Otto. Model Project: Towns for Cyclists. Garten und Landschaft, Dec. 1980.
2. K. Otto. Infrastruktur Wichtiger als Langes Radwegenetz. Demokratische Gemeinde, Feb. 1981.
3. M. Fikke, B. Mohren, and K. Otto. Modellvorhaben Fahrradfreundliche Stadt. Federal Environmental Agency, 2nd ed., Berlin, Federal Republic of Germany, 1980.
4. SOCIALDATA, Institute for Empirical Social Research. Das Potential des Fahrrads im Ausserortsverkehr. German Ministry of Transport, Munich, Federal Republic of Germany, 1981.
5. W. Brög. Mobilität und Verkehrsmittelwahl in Ballungsgebieten. In Schriftenreihe des Instituts für Verkehrsplanung und Verkehrswesen der Technischen Universität München, Vol. 17, Munich, Federal Republic of Germany, Dec. 1980.
6. W. Brög and E. Erl. Interactive Measurement Methods: Theoretical Bases and Practical Applications. TRB, Transportation Research Record 765, 1980, pp. 1-6.
7. W. Brög and K. Otto. Potential Cyclists and Policies to Attain this Potential. Paper presented at Planning and Transport Research and Computation Company, Ltd., summer annual meeting, Univ. of Warwick, England, July 1981.
8. W. Brög, O. Förg, and D. Lippert. Measurement of Attitudes Toward Various Modes of Surface Transportation--A Critical Comparison of Different Survey Methods. Munich, Federal Republic of Germany, 1980.
9. W. Brög and E. Erl. Development of a Model of Individual Behaviour to Explain and Forecast Daily Activity Patterns in Urban Areas. Paper presented at Planning and Transport Research and Computation Company, Ltd., summer annual meeting, Univ. of Warwick, England, July 1981.
10. W. Brög. Latest Empirical Findings of Individual Travel Behaviour as a Tool for Establishing Better Policy-Sensitive Planning Models. Paper presented at World Conference on Transport Research, London, England, April 1980.
11. W. Brög. Cooperation Between Empirical Social Research on Transport Behaviour and Transport Policy Making. Paper presented at Conference on Social Aspects of Transport: How to Use Social Research in Transport Policy Making, Chichester, England, Sept. 1980.
12. H. Blumer. Methodologische Prinzipien Empirischer Wissenschaft. In Explorative Sozialforschung (K. Gerdes, ed.), Stuttgart, Federal Republic of Germany, 1979, p. 41.
13. W. Filstead. Soziale Welten aus Erster Hand. In Explorative Sozialforschung (K. Gerdes, ed.), Stuttgart, Federal Republic of Germany, 1979, p. 37.
14. I.G. Heggie. Putting Behaviour into Behavioural Models of Travel Choice. Working Paper No. 22, Jan. 1977.
15. W. Brög and E. Erl. Application of a Model of Individual Behaviour (Situational Approach) to Explain Household Activity Patterns in an Urban Area and to Forecast Behavioural Changes. Paper presented at International Conference on Travel Demand Analysis: Activity-Based and Other New Approaches, St. Catherine's College, Oxford, England, July 1981.
16. W. Brög. Behaviour as a Result of Individual Decision in Social Situations. Paper presented at Research Conference on Mobility in Urban Life, Arc-et-Senans, France, Sept. 1979.
17. W. Brög. Mobility and Lifestyle--Sociological Aspects. Paper presented at 8th International Symposium on Theory and Practice in Transport Economics, Conference Europeene des Ministres des Transport, Istanbul, Turkey, Sept. 1979.
18. SOCIALDATA, Institute for Empirical Social Research. PKW-Fahrer Testen den Verbund. Verkehrsverbund Stuttgart, Munich, Federal Republic of Germany, 1980.

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