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drinking by motorists

Report and results of roadside surveys into drinking and driving of Dutch motorists during weekend nights in Autumn 1970, 1971, 1973, 1974 and 1975.

SWOV

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The Institute for Road Safety Research SWOV was founded in 1962. Its object is, on the basis of scientific research, to supply the authorities with data for measures aiming at promoting road safety. The information obtained from this scientific research is disseminated by SWOV, either as individual publications, or as articles in periodicals or via other communication media.

SWOV's Council consists of representatives of various Ministries, of industry and of leading social institutions.

The Bureau is managed by E. Asmussen, SWOV's Director. Its departments include: Research Policy, Research Co-ordination, Research Services, Theoretical Research Pre-crash Projects, Applied Research Pre-crash Projects, Crash and Post-crash Research and Information.

More information is to be found in the brochure Aims and Activities, available at request from the Information Department SWOV.

Contents

Introduction

This report, Drinking by Motorists, is the second in a series of reports on Research into Drinking and Driving which SWOV is planning to publish.

This series of reports describes the investigations which SWOV has made over a number of years into drinking by road users and its dangers in road traffic.
Step by step — and for each report — the research is described in order to increase as much as possible the knowledge of all those concerned in dealing with this problem. In our view, it is also useful if not essential for those who feel they are primarily concerned with a specific aspect of the problem to become acquainted with all the facets of drinking by road users and its dangers in road traffic, as brought out by this research, in order to form a well-balanced opinion.

The first in the series is Drinking and Driving (SWOV, 1976). It is a study of the (scientific) literature on research in The Netherlands and other countries into drinking by road users and its dangers in road traffic and into actions that have been taken to reduce it. This literature study was necessary to compare the effect of actions taken in The Netherlands with experience in other countries. Because of its extensive nature, research into the influence of the new legislation in The Netherlands on 1st November 1974 is not described in this. It is the subject of a seperate report (Noordzij, 1977).

The second in the series is Drinking by Motorists. It comprises the report and results of roadside surveys into drinking and driving in the years 1970, 1971, 1973, 1974 and 1975. It gives a detailed representative description of drinking by Dutch motorists during weekend nights in autumn, both before and after the introduction of the new legislation.

The third report in the series will be that on Breath-Analysis Apparatus. It reports the tests, as part of the roadside surveys into drinking and driving, of breath-analysis apparatus of different kinds and makes, for determining the extent to which road users are 'under the influence of alcohol'. It gives indications regarding the usefulness and reliability of such apparatus, for the purpose of scientific research. It is intended, to publish the complete report on this research in English in the course of 1978.

The fourth is the series is Possibilities of Limiting the Dangers of Drinking by Road Users, a contribution for discussion. It comprises a provisional finalisation of SWOV research on this subject in the form of an interpretation of the results focussing upon measures and activities that might be considered. This contribution will also be available, translated into English, in the course of next year.

Foreword

The plans for roadside surveys into drinking and driving arose from the literature study Alcohol and Road Safety (SWOV, 1969). Both research in other countries and Dutch police statistics made it likely that drinking was a major contributory factor in road accidents in The Netherlands as well. Police statistics on drinking by accident-involved road users, however, give no more than indications of the actual alcohol consumption. Moreover, the number of accidents or casualties attributable to drinking would still have to be estimated from these sparse data.
An investigation of drinking by accident-involved road users or by road-traffic victims has proved impossible in The Netherlands.
Another point of departure is the answers to the questions: how dangerous is it to drive after drinking and how often do motorists drive after drinking? It is assumed for the moment that the answer to the former question (How dangerous is it to drive after drinking?) is adequately known (See Drinking and Driving, SWOV, 1976). An answer to the second question (How often do motorists drink?) requires scientific research.

The literature study in 1969 also indicated that an important measure against driving while intoxicated is the introduction of a statutory blood alcohol concentration limit. Preparations for introducing this regulation called for research into the effect of the BAC limit.
With such a drastic measure it is important to establish whether it meets the purpose aiming at: reducing drinking by road users. In order to establish its effect the extent of drinking by road users must be ascertained during a period before and a period after the introduction of a statutory limit.

Research into Drinking and Driving is monitored by a Government Working Party including representatives of a number of ministries. In this party, there is detailed consultation on the objectives, design and execution of the research.

This report covers all the roadside surveys. Analysis and presentation of results is focused particularly upon the influence after one year of the 1st November 1974 change in the law.
Attention is also given to a number of variables which are likely to be related to drinking by motorists or a connection of which with drinking may have practical implications. The results can be used, for example, in planning publicity campaigns and police supervision. For publicity campaigns data are needed, for instance, on the extent of driving while intoxicated, personal data on motorists who have been drinking, the circumstances in which they have been drinking. For police supervision it is important to know the circumstances in which a lot of drinking is likely and whether there are any simple indications for expected drinking of motorists, such as age and sex of the motorist.
In the future, further analysis of the material is necessary during which all kinds of possible relationships between variables (with drinking as the most important) can be sought and specific questions can be answered.

In interpreting the results it must be borne in mind that there are limitations in the design of the surveys, especially as regards the times of the investigations (weekend nights) and te road users (motorists).

Persons interested can request a copy of an Appendix containing diagrams or illustrations giving a more detailed account of the following data:

1. Towns, days and dates of surveys 1970 to 1974.
2. Towns, days and dates of surveys 1975 and the movement schedule 1975.
3. Questionnaire 1970, 1971, 1973.
4. Questionnaire 1975.
5. Reweighting method and results of reweighting for 1971.
6. Distribution of persons refusing and collaborating by time, sex, age and nature and region of municipalities where surveys were made in 1971, 1973 and 1975.
7. Relationship between weekend and BAC distribution in 1970, 1971, 1973 and 1975.
8. Relationship between location traffic density and BAC distribution in 1975.
9. Statistical analysis: List of variables and results of statistical tests.

This report has been compiled by the project leader of the Research into Drinking and Driving, P.C. Noordzij, research psychologist, acting head of the Department of Applied Research Pre-crash Projects, with the assistance of A.A.Vis and J.A.G.Mulder.

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Summary

The Research into Drinking and Driving consists of a.o. a number of roadside surveys spread over a number of years. Their characteristic feature is that in weekend nights in autumn a national sample is obtained of motorists on the road. Their blood alcohol concentration was determined. This provides an answer to the question how much drinking is done and by what percentage of drivers.
Other data were recorded as well, so that it can also be ascertained who had been drinking and where and when.

The surveys were made during weekend evenings and nights because a lot of drinking is then likely. Autumn was chosen because the results were then likely to be approximately the average for the year.
The surveys were made in 1970, 1971, 1973, 1974 (limited in extent) and 1975. The principal features were:
- on Friday, Saturday and Sunday night
- from 10.00 p.m. to 4.00 a.m.
- at ten weekends in autumn
- in 1970, 1971, 1973, 1974 and 1975
- samples for municipalities with over 20,000 inhabitants
- samples of locations per municipality
- samples of passing motorists
- determination of blood alcohol concentration (BAC)
- replies to a questionnaire

1. Purpose of the research

The purpose of the research can be subdivided into:
1 (a) Collection of data on Dutch motorists' drinking and driving habits in order (b) to trace and interpret possible changes in drinking and driving habits after alteration of Article 26 of the Road Traffic Act.
2. To make suggestions for supplementary measures which might be adopted with regard to drinking as related to road usage with a view to increase road safety.
3. Collection of data on the value of breath analysis for general scientific studies.
Some general notes are given on each of the objectives.

1.1. Data on drinking and driving habits

There are quite a few sterotyped views of the motorist who 'drives while intoxicated'. He may be looked upon as an 'alcoholic', or as a 'social drinker', or he may be depicted as an offender against all kinds of social rules and laws.
Measures — regulations, police supervision and publicity — against driving while intoxicated should be focused upon the potential drinking driver.
It is therefore essential to have more realistic information than stereotyped opinions about which, moreover, views differ.
Though research has already been undertaken — both in The Netherlands and other countries — for this purpose, research outside The Netherlands does not automatically apply to this country because it is related to a specific cultural pattern, while Dutch research may give a destorted picture owing to the research method.
In the past, data were used relating to motorists at times they were driving and/or data relating only to convicted motorists. The drinking and driving survey is based on data (breath or blood analysis, interviews) obtained from a random sample of motorists in a passing flow of traffic. Data for sober drivers were also collected, in order to ascertain afterwards whether those 'driving while intoxicated' differ from sober drivers as regards driving conditions (trip length, origin, destination, type of road, traffic density, time, etc.), driving experience and personal data (age, sex, social status, experience of driving while intoxicated, etc.).

1.2. Effect of change in legislation

A regulation against driving while intoxicated already existed in The Netherlands. A change in the Act, one of the main points of which is that the expression 'driving while intoxicated' was superseded following examples in other countries, by 'driving with a blood alcohol concentration above a specified limit' was aimed at being more effective.
The (lasting) effect of a change in the law can be ascertained only by scientific research. Data obtained in roadside surveys preceding the operation of the proposed change have to be compared with those obtained in similar surveys after the change takes effect. In countries where the law has been changed with respect to driving while intoxicated, the effect of this has never been established on a wide scale.

Firstly, the effect may be apparent from the knowledge which motorists, for instance, have of the legislation; though a knowledge of the law does not imply that they do or will behave accordingly. The most direct way of measuring the impact of the change is a reduction in actual drinking by those covered by the roadside surveys. A change in drinking habits, however, must not be automatically attributed to the change in the law; the possibility of other influences will have to be thoroughly assessed before it can be indicated to what extent it is due to the change in the law.

1.3. **Supplementary measures**

The results of the roadside surveys into drinking and driving can provide the possibility of better application of the principles of selective traffic supervision in police enforcement of Article 26 of the Road Traffic Act. Replies to questions during interviews can indicate what publicity and other measures are likely to have the greatest impact. A condition for this is that the answers to the questions during interviews are as honest as possible.

1.4. **Breath analysis**

Blood analysis has so far been regarded as the most accurate method of establishing the BAC. But the breath test has the advantage of being simpler and cheaper. The roadside surveys into drinking and driving are also aimed at checking the breath test for its value for general scientific purposes and at verifying the reliability of the various kinds of breath analysis devices.

2. Design

2.1. **Introduction**

Prior to the definitive design of the roadside surveys into drinking and driving, a pilot study was made in Middelburg in June and July 1968 during the nighttime hours at three weekends. The aim of this was:
(a) to see whether the roadside surveys were practicable (for instance as regards cooperation by road users);
(b) to gather indications for designing the definitive roadside surveys (including the extent and composition of the sample, composition of the survey team, nature and compilation of the questionnaire and the necessary equipment);
(c) To decide whether there was any point in continuing the testing of breath analysers on a larger scale.

Based on the results of the pilot study (Noordzij, 1969), it was decided to carry out extensive roadside surveys, the original design of which will first be discussed below. The design and execution were constantly adapted in the iterated roadside surveys.

2.2. **Original design 1970**

2.2.1. *Subjects*

From the pilot study it appeared that both motorists and moped riders had been drinking.
It was ultimately decided that the definitive roadside surveys would cover motorists only, in order to make the choice of locations easier. Moreover, two-wheeled traffic is likely to fluctuate more owing to particular weather conditions. The starting point was that the ultimate sample would have to comprise at least 2,000 persons to permit of adequate differentiation and for statistical demonstration of any changes in drinking habits.

2.2.2. *Time*

Police statistics showed that about 40 per cent of alcohol-related accidents involving injury occur during weekend nights. The roadside surveys were therefore limited to this period, i.e. Friday, Saturday and Sunday evening/night from 10.00 p.m. to 4.00 a.m. Autumn was selected as the time for the roadside surveys, because the least variation in drinking and driving habits from year to year was expected at this time (when there is no holiday traffic and no public holidays), except due to measures taken with a view to modifying these habits.
It was agreed that during the period of the roadside surveys there would be no special police campaigns (unless strictly necessary). The roadside surveys would be carried out in ten weekends from mid-September to mid-November.

2.2.3. *Location*

The following procedure was applied in selecting the test municipalities.

A group of 30 municipalities was chosen, a proportional representation of regional areas and municipality sizes being aimed at (See Tables A and B).

Per regional area and municipality size the towns were chosen at random. For both B and C two groups were determined: should it prove impossible for any reason to include a group-one municipality in the research then one of group-two was taken instead, comparable by regional area and municipality size.

Towns with fewer than 20,000 inhabitants were not included in the sample because it was unlikely that enough subjects could be approached in a reasonable time owing to there being too little traffic at the time of the roadside surveys.

Some municipalities could not be included in the sample because the local police could not provide the necessary assistance. Of the big cities, this applied to Amsterdam and The Hague; among the other categories there were the university towns. Data for The Hague were replaced by combined data for Voorburg and Rijswijk (large suburbs of The Hague). The three big cities may seem to be overrepresented in the sample, but on the other hand the same number of locations was selected for each municipality regardless of its population.

The criteria for selecting the locations, in each municipality were:

- three points: one in the town centre, one on an entry route and one on an exit route;
- enough traffic during times of roadside surveys;
- enough parking space for the research vehicle and the cars of drivers taking part in the interviews;
- the possibility of getting motorists safely out of the flow of traffic;
- the existence of street lighting, to dispense with the need for extra lighting or marking which would attract attention;
- no plans for reconstruction in the vicinity, so that the tests could be repeated.

The locations were decided on in consultation with the local police.

2.2.4. *Schedule*

A total of 90 locations divided over 30 municipalities were visited by a roadside survey team. Each point was visited once only. The municipalities were visited once at random one Friday, Saturday and Sunday night, each municipality being visited only once each weekend. Some of the town-centre points were visited on Friday, some on Saturday and some on Sunday. The same applied to entry and exit routes. Owing to the size of the research vehicle and the time needed for installation at the site (preparing and adjusting equipment, etc.) a roadside survey team stayed at the same place for the night. Three teams were needed in order to visit all the locations under these conditions in ten weekends.

2.2.5. *Procedure during fieldwork*

The procedure for dealing with each subject was briefly as follows:

- every 6 to 8 minutes the police at the team leader's request stopped a motorist in the stream of cars passing by and referred him to a (recruiting) member of the team;
- he asked the motorist whether he was prepared to assist is the roadside survey, briefly explained its purpose and conducted the subject to the first member of the team in the vehicle (the interviewer);
- each subject received from the recruiting member a route card on which each part of the survey was initialled by the team member concerned;
- during the initial introduction the recruiting member guaranteed that the subject's

Size of municipality	Number of municipalities in population	Number of municipalities in sample	Sample / population
A. Big cities	3	2	.67
B. Inhabitants > 50,000	36	9	.25
C. Inhabitants 20,000 to 50,000	77	19	.25

Table A. Representation of towns in sample by size of municipality.

Regional area	Size of municipality					
	⩾ 50.000 population	sample	sample / population	20.000 - 50.000 population	sample	sample / population
North	3	1	.33	13	3	.23
East	9	2	.22	17	4	.24
West	16	4	.25	15	6	.24
South	8	2	.25	22	6	.27

Table B. Representation of towns in sample by size of municipality and regional area.

personal particulars would be kept absolutely secret and therefore participation in the survey would have no legal implications;
- the interview lasted about 10 minutes;
- a doctor took a sample of (venous) blood, this being preceded by a short medical interview in order to ascertain any contra-indications against taking his blood;
- prior to and after the visit to the doctor, a breath test was made;
- upon leaving the vehicle the subject was handed part of the route card giving information on SWOV's objectives and activities and on the purpose of the research;
- as soon as an interviewer became available, the police were asked to send a new subject to the recruiting member of the team.

Depending on how talkative the subject was and how much he had drunk, for instance, the entire procedure took about 15 minutes per person. Depending on the volume of traffic, the team's capacity per evening/night was about 35 subjects.

2.2.6. *Referral by police*
Prior to the fieldwork the Government Working Party went in detail into the procedure to be adopted in selecting motorists. In any event, a motorist brought off the road by a police official had to be prevented from driving off again if he was suspected of an offence under Article 26 of the Road Traffic Act. Such a suspicion could arise either before commencement of the survey in view of the driver's conduct as observed by the police official or else during the survey in view of the breath-test result or his observed behaviour.
The value of the survey depends very much on the sample drawn from the flow of traffic corresponding as closely as possible to the traffic flow in reality. The quantitatively small group of motorists with a relatively high BAC is therefore very important because of their greatly increased accident risk. The lack of data for a part of this group would greatly reduce the value of the research.
Agreement was ultimately reached on a procedure with adequate legal and scientific safeguards both before and after the alteration of Article 26. Briefly, the procedure was that the police official would refer a driver to the recruiting member of the team unless his observed (driving) behaviour suggested that he had committed an offence under Article 26 or if some other offence was detected. If there proved to be no grounds for this suspicion, the driver was referred to the recruiting member. If, in the former case, a blood test was taken by a police surgeon, the result together with limited particulars (anonymous data such as age and sex) would be passed on to SWOV. This procedure caused no problems.
After alteration of Article 26, the position became simpler still because the possibility was created for the police of giving orders and directions in the interest of the survey.

2.2.7. *Refusals*
Motorists who told the recruiting member of the team that they declined to take part in the survey were not only informed about the roadside surveys, but were also handed a special questionnaire with the request to complete it and send it to SWOV. The team member noted on the part of the route card retained by SWOV several particulars (including the reason for refusal, sex and age group of the driver and, if possible, whether he had been drinking).

2.2.8. *Questionnaire*
The pilot study had shown that the interview should not take longer than 10 minutes. The questions ultimately asked can be divided into the following categories:

- personal characteristics (sex, age, occupation, place of residence, income, education etc.);
- driving habits (annual mileage, driving experience);
- drinking habits (consumption of alcohol, frequency, kinds of drink, driving after drinking);
- purpose of trip (origin and destination);
- occupancy of vehicle (kinds and number of passengers);
- knowledge (of regulations, method of determining consumption of alcohol);
- opinion (of matters related to drinking and road traffic, such as whether it is right or not to drive oneself with a given BAC.

The interviews were carried out and processed by N.V. v/h Nederlandse Stichting voor Statistiek, The Hague.
The length of the interview — average 10 minutes — was checked in a number of trial interviews.

2.2.9. *Procedure for motorists with high BAC*
It could be found during the survey that a person was considered incapable of driving his car properly. Similarly to the selection procedure, a procedure was agreed upon intended for before and after the alteration of Article 26 of the Road Traffic Act. The person concerned was offered suitable transport — mostly a taxi — at SWOV's expense. If the person persistently refused to accept the offer, the police official was asked to ban him (temporarily) from driving, without any further juridical implications.

2.2.10. *Determination of BAC*
For determining the BAC a (venous) blood sample was taken preceded and followed by a breath test; in some cases there was a further breath test, partly to try out various analysers and partly for better determination of the absorption phase of blood alcohol in a person who had been drinking. The breath tests were conducted by an analyst trained for this purpose.
This procedure affected the composition of the team, the equipment of the research vehicles and the time to be spent on each subject. Full details of determination of the BAC are given in the SWOV report on 'Breath-Analysis Apparatus; Tests of apparatus for determining the alcohol concentration of exhaled air in laboratory and practical conditions'.

2.2.11. *Composition of survey teams*
A survey team was composed as follows:
- 1 physician to go through a short medical questionnaire and take a blood sample;
- 2 interviewers to go through the questionnaire;
- 1 analyst to operate the breath analysers;
- 1 recruiting member to introduce drivers to the project and conduct them to the survey team;
- 1 team leader for consultations with the police and for transportation of drivers not allowed to drive on themselves; he was also responsible for the continuity of the surveys and for ensuring that everything went smoothly;
- 1 driver for moving the research vehicle and attending to the supply of electricity;
- 2 police officials for directing motorists to the recruiting member.

The other work (traffic counts, attending to vehicles and taking them away if necessary) was done by various members of the team depending on operations and circumstances. Stand-by members were always available for every job.

2.2.12. *Accommodating survey teams*
The three teams were accommodated in mobile offices belonging to the Royal Dutch Touring Club (ANWB), made suitable for the survey by means of minor interior modifications. One vehicle was kept in reserve.

2.2.13. *Publicity*
An effort was made to inform motorists as fully as possible of the project without giving details of time, places or dates. A press release was issued several weeks before the roadside surveys started.

2.3. Annual changes in survey design

The principle was to design the survey so that interim alterations were precluded as much as possible. This was because data for the period prior to the change in the law were to be compared with those for the period thereafter.
But local situations inevitably changed and locations had to be adapted. Besides this, some parts of the survey as planned were modified somewhat while it was being carried out because of the experience that had meanwhile been gained. For example, the questionnaire was changed in some matters of detail and use was made of the possibilities presented by new breath and blood analysis methods. Such modifications did not detract from the value of the results or their comparability from year to year. The modifications are described below for each year.

2.3.1. *1971*
1. A number of locations had to be replaced owing to the points or their immediate surroundings being reconstructed. The same selection criteria were applied for the replacement points as for the original ones and the subjects were also drawn from the same or comparable traffic flows. No effect upon the results was expected.
2. The BAC was determined with different breath analysers. This change was, of course, a logical consequence of the objective of collecting data on the value of breath analysis for general scientific research. All the breath analysers used in these checks are reviewed in the relevant SWOV report. The material used for blood sampling was also modified on the basis of practical experience.
3. Based on experience gained in the first year, the questionnaire was adapted on a number of points. The alterations were not of a fundamental nature but were merely intended to streamline and clarify the questions.

2.3.2. *1973*
1. In that year several locations again had to be replaced owing to changes in local conditions. The same selection criteria were again applied and the subjects were again taken from the same or comparable traffic flows, and hence no influencing of the outcome was anticipated.
2. Again, the questionnaire was changed in some matters of detail.
3. Again, several new types of breath analysers were used, and the blood sampling materials were again adapted in the light of practical experience.
4. Owing to the introduction of the Sunday driving ban just at the time of the surveys, the project was discontinued after the seventh weekend.

2.2.3. *1974*

Research in 1974 differed greatly from that already carried out, both in objective and planning.

1. *Objective*

It was not the original intention to carry out a survey either shortly before or shortly after the change in the law. Any measurable effects were likely to be short-lived, while the original objective was aimed at lasting effects. The announced change in Article 26, however, produced so many favourable and unfavourable reactions that a last-minute decision was taken to investigate the short-term effects and all related events after all. Besides information about the short-term effect, the investigations also provided practical experience for roadside surveys into drinking and driving under the changed (legal) situation.

2. *Design*

The different objective and the limited time for preparation necessitated a number of modifications in design compared with the previous years. As the purpose was to detect short-term effects, it had to be possible to examine the results weekend by weekend. This meant that the numer of observations per weekend had to be increased. As three teams were available (and because of the availability of equipment), each team's capacity had to be stepped up. This was achieved by determining BAC's by breath analysis only and by shortening the questionnaire. Though the questionnaire as a whole was shortened, several fresh questions were added nevertheless. In this way, about 5 minutes were needed for the answers.

The surveys were made during three weekends: 25th, 26th and 27th October, 8th, 9th and 10th November and 22nd, 23rd and 24th November. The first weekend was thus before the change in the law, the two others after.

The municipalities were selected from the original group of 30 from the previous projects, due attention being paid to distribution by regional areas and municipality sizes. It was decided to end the surveys at 3.00 a.m. instead of 4.00 a.m. in view of the small volume of traffic in the last hour.

2.3.4. *1975*

The first complete roadside surveys after the change in the law were made in autumn 1975.

The projects in 1970, 1971 and 1973, which established the situation prior to the change in the law, differed only slightly in design and execution. That in 1974, which was carried out shortly before and shortly after the change, already yielded some practical experience of value for surveys in the changed situation in 1975. Partly because of this, several more drastic changes were made.

1. *Subjects*

A number of considerations play a part in determining the minimum number of subjects who have to be covered:

A. A certain minimum number is necessary for establishing changes in the frequency distribution of motorists' BAC's with any certainty. In the earlier surveys the number was always 2,000. With the 3 teams, 10 weekends and 3 nights (Friday, Saturday and Sunday), this had never caused any problems. This number was not reached in 1973, but three of the ten weekends then had to be abandoned because of the Sunday driving ban. If the volume of traffic remained the same, and with the same refusal rate and the same team capacity, no problems were expected in 1975 using 3 teams for 10 weekends.

As to the volume of traffic and the refusal rate with the new regulations, experience in 1974 already gave some idea:
- the number of refusals was lower than in previous surveys;
- the volume of traffic caused no problems either, because double the number of subjects were easily reached with the then increased team capacity (except in the early morning hours — which was already known!). Team capacity was reduced somewhat by a change deemed necessary in the design (change of location half-way through the night). But this reduction in capacity was offset by adapting the original questionnaire, by dropping the blood test in many cases and by adapting the breaks.

B. A second consideration in determining the necessary number of subjects is the number who have been drinking (i.e. with a BAC in excess of 20 mg/100 ml) as the necessary minimum for statistical analysis for this category.
It is difficult to indicate an absolute minimum, but al least 150 is envisaged. Whether this number could really be reached in 1975 depended, inter alia, on drinking and driving habits in the period covered by the surveys. Only a rough assumption could be made as to this. Previous years' figures might give some indication.
Based on the assumption that the number of drinking drivers in 1975 would be about half that in 1970, 1971 and 1973, and hence twice as many as in November 1974, then the number of persons with a BAC of 20 mg/100 ml or higher would be in the region of 450, i.e. ample for analysis.

C. A third consideration is the possibility of subsequent verification of the breath analysis by means of blood analysis. Such verification was considered pertinent in cases of a positive BAC (found with a breath test). For this category, too, 150 are sufficient. Based on the estimate of 450 persons with a BAC of $\geqslant$ 20 mg/100 ml, it would suffice to have the blood test for verifying the breath test made by only one of the three teams.

2. *BAC determination*
In the 1970, 1971 and 1973 surveys both blood and breath tests were made with as many persons as possible. The results of comparing both were such that a provisional choice can be made of a breath analyser instead of the blood test: the Omicron Intoxilyzer.
The 1974 surveys had already been made with breath analysis only. With this provisional choice, it seemed advisable to have a built-in verification by means of blood samples taken by one of the three teams. These were limited to persons whom the breath test showed to have been drinking. The number of persons for whom blood samples would then be available according to the earlier rough estimate would be about 150. This is ample for verification of the comparability of breath and blood tests. In cases where the breath test only was used, the outcome was not accepted as it was but was adjusted in order to obtain the closest possible estimate of the BAC.

3. *Locations and times*
In order to keep the tests comparable from year to year, the design for 1975 had to be as close as possible to the original scheme. There were no problems regarding comparability of the period of the surveys (number of weekends, days of the week and hours of the night). Every time the survey was repeated, a number of locations (or their immediate surroundings were found to have changed so much that a different location in the same municipality had to be sought. 1975 was no exception to this. As compared with 1970 a large number of locations ultimately proved to have changed. This did not

seem to be a big drawback because the provisional results (in terms of BAC distribution) did not disclose any major differences as between the types of location. The limited surveys in 1974 had taught that it quickly became known that 'check-ups' were being made at certain points.
This happened in earlier years, too, but after alteration of the Act it seemed to have more consequences. Some motorists chose a different route, parked their cars or waited till the survey team had left.
Several of the original locations selected in consultation with the local police also proved to be used regularly as locations by the police themselves, especially after 1st November 1974. Particularly in such cases, the places were avoided, presumably mainly by motorists who had been drinking. Owing to the haste in making the preparations and the lack of experience of the changed legal position, it was not possible in 1974 to solve all the problems of selecting locations.
For 1975, two solutions were proposed:
1. Revision of the choice of locations in each municipality.
2. Movement of the survey team after several hours.
The second solution meant that more locations per evening were needed in each municipality. In order not to affect the team's nightly capacity too much, it was decided to introduce one move per team per evening; the locations would not have to be too far apart owing to the time needed for the move. It seemed inadvisable to visit a specific location more than once during the research. This meant for each municipality — on the basis of the original 30 — that six instead of three locations would have to be selected. This was no problem in bigger municipalities, but in smaller ones (20,000 - 50,000 inhabitants) it was sometimes impossible. In this event, substitute or supplementary municipalities were selected with the same population and in the same regional area. In the initial contact with the 'new' municipalities, the Government Working Party (and Central Police Traffic Committee CPVC) acted as intermediaries. The teams were moved about half-way through the evening without there being any time during which no team at all was collecting data. This was achieved by reserving a maximum of one hour for the move: one half of the moves from 24.00 to 01.00, the other moves from 01.00 to 02.00 hrs.
In 1975, the basis was again a representative national sample stratified by regional areas and size of municipality. In discussing the locations, the increase to 42 municipalities was explained. The new municipalities were all selected so that they were located in the same region and were of the same size as those they replaced or supplemented.
The new sample thus satisfied to the same extent the requirements of representativity as the original one from 1970 - 1971. (The same limitations of course also applied, such as the absence of Amsterdam, The Hague, university towns, and municipalities with fewer than 20,000 inhabitants.)

The increase in the number of municipalities was therefore mainly in the category of smaller municipalities because it is in these that it often proved impossible to find such suitable location. Owing to the increase in the number of locations there is always a possibility that in 1975 the sample included relatively more locations with a low(er) traffic density, than in 1970, 1971 and 1973. In order to examine whether the change had influenced the BAC distribution, for example, traffic density in 1975 was included as a sepearate variable.

4. *Questionnaire*
The questionnaire was again adapted to the (new) situation on several points of detail.

There was a more sweeping change as regards the processing of the interviews. While the earlier versions of the questionnaire (1970, 1971 and 1973) had to be coded afterwards, the form used in 1975 was coded directly by the interviewers. The completed questionnaires were read mechanically.

3. Execution

3.1. Number of subjects

Data on the collaboration by motorists, the number for which a BAC value was determined and the basis on which this was done are presented in Table C for all the years of the surveys.
The big decrease in the refusal rate in 1974 is striking. There was a 'recovery' again in 1975.

3.2. BAC values

Table C shows that the BAC values were arrived at partly from blood samples, and partly on the basis of either one or two breath analyses.
In the latter case the result of the breath test or tests was used to determine the BAC with the regression formula for the breath analyser concerned.
A detailed description of breath analysis, blood analysis and the method of arriving at BAC values is given in the SWOV report on Breath-analysis apparatus.

In 1973, BAC values were based more widely on breath analysis than in 1970 and 1971; this was even more so in 1975, while in 1974 the BAC's were determined from breath tests only.

	Year 1970	1971	1973	1974	1975
Number of motorists asked to collaborate	3141	3417	2617	1946	4039
Number and percentage of refusals	451	434	483	67	455
(when first approached)	14%	13%	18%	3%	11%
Number of motorists for whom necessary processing data were lacking	10	1	—	12	9
Number of motorists for whom no BAC could be determined	5	15	25	119*	31
Number and percentage (of total asked)	2675	2967	2109	1748	3544
for whom a BAC was determined	85%	87%	81%	90%	88%
Number and percentage (of total BAC's) for	2305	2413	1125	—	311
whom BAC was based on blood sample	86%	81%	53%		9%
Number and percentage of motorists for whom	370	554	984	1748	3233
BAC was based on breath sample	14%	19%	47%	100%	91%

* Owing to an analyser becoming defective, no BAC's could be determined one evening at one location. This was in the first weekend, however, while for 1974 only data for the other weekends were used for determining the short-term effect on the change in the law.

Table C. Number of subjects, refusal rates and BAC determination

4. Processing

4.1. Reweighting

The number of subjects who could be handled per unit of time by a team was fairly constant, but the number of passing cars varied greatly in place and time. The ratio of numbers interviewed to the number of passing motorists — the interview-ratio — was therefore spread greatly by the time and place of investigation. The interview-ratio is expressed in a percentage indicating the number of interviewed motorists per 100 passing motorists. In 1970 and 1971 the interview-ratio varied, for instance, from an average of 4% in the first hour's observation to an average of 25% in the last. By size of municipality it varied from an average of 2% in the cities to an average of 10% in rural areas. Without reweighting, the last hour's observations and those in small municipalities would have been relatively overrepresented in the sample. This would not matter if the results concerning drinking were hardly dependent, if at all, on the time of evening/night or size of municipality. But this relationship did exist indeed for the time of observation: the later it was in the evening/night the more evidence of drinking there was.
There were practically no differences in BAC distribution by locations.
Reweighting for time of observation was therefore necessary, but not for size of municipality.
The basis of reweighting was the ratio of the number of passing cars to the number of subjects in the same period. For each location the night was divided into three two-hour periods (22.00 - 24.00, 24.00 - 02.00 and 02.00 - 04.00 hours) and the ratios mentioned above were ascertained for each period. Next, the ratios were subdivided into classes.
After this, the weighting factor was determined for each class so that the ratio between the number of passing cars and the number of subjects per location per two-hour period was about constant.
For considerations of processing methods and finance, it was decided to keep the number of different weighting factors and the level of the highest factor as small as possible.
The original number of observations in 1971 was 2982; after reweighting these were increased to 7908 (cards). For 1970, the numbers were 2680 and 7100.
The distribution by extent of drinking with the reweighting method employed is practically the same as that which would have been found had reweighting been done every half hour. Distribution by size of municipality with the reweighted data proved to be almost identical to that with the original unweighted data.

The circumstances leading to (some) limitation of the number of different weighting factors and the level of the greatest factor in 1970 and 1971 no longer existed in 1973. For all 189 observation periods in 1973 the weighting factor was determined by dividing the number of passing motorists observed in each period (V) by the number of motorists interviewed in that same period (N). This quotient V : N rounded off to a whole number was put on the processing tape for each subject. The numbers so reweighted were practically identical to those of observed traffic.

The unweighted stock in 1973 was 2134 observations; reweighted it was 32690.

In 1974 the same reweighting procedure was applied as in 1973. In that year there were 81 observation periods. The unweighted stock for all three weekends, 1867 observations, provided a weighted stock of 16625.
Lastly, for 1975 the 1973 reweighting method was used again. The unweighted stock of 3575 was reweighted to 43654.
Care was constantly taken in the statistical analyses to weight all years the same.

4.2. **Refusals**

To ensure a representative sample it was important that persons refusing to collaborate (when first asked by the recruiting member of the team) should not differ from those who did collaborate.
This could not be verified or not be verified directly on all points. In order to obtain some information about the persons refusing, the team member recorded a number of data. It can be concluded from the distribution of persons refusing and collaborating by time, sex, age and size of municipality and regional area that no significant differences were noted in 1971, 1973 and 1975.
Little was known about the value of the estimated alcohol consumption. The observed percentages, however, give no grounds for presuming there was any great difference in drinking as between persons refusing and those collaborating. The data for 1970 and 1974 were not worked out because the 1970 records were too incomplete, and in 1974 there was a low refusal rate.

4.3. **Comparability of different years' results**

4.3.1. *General*

The bottom limit for establishing whether a person had been drinking or not was put at 20 mg/100 ml. This rather high non-drinking upper limit had to be used owing to disturbances in analyzing very-low-BAC blood in 1973. To ensure comparability, this limit was used for the other years as well. In 1975 and 1974, subjects whose BAC was not known were not included in assessing the results. For the other years they were included in the $<$ 20 mg/100 ml group. The numbers concerned in all cases are too small to affect the overall results (See also 3.2.). The 1974 data relate only to the combined results for the two weekends after 1st November, i.e. after the change in law.

4.3.2. *Weekend/BAC distribution relationship*

In 1973, the research was stopped after seven weeks because of the Sunday driving ban. This might have affected comparability of the 1973 results with those for other years if a relationship existed between weekends and BAC distribution. It was concluded that the comparability of the results was not affected.

4.3.3. *Location traffic density/BAC distribution relationship*

In 1975 there was a big increase in the number of locations and there may thus have been relatively more locations with a low traffic density in the sample. This again might affect the comparability of the results with those for previous years. The relationship found between traffic density at locations and BAC distribution indicates that this is not the case.

4.3.4. *Distribution of samples by regional area and size of municipality*
The sample of municipalities and locations was kept as constant as possible throughout the years. This implies that the distribution of the sample of motorists over the various regional areas and sizes of municipalities should not be allowed to differ much from year to year. Statistical tests show that such differences nevertheless occur (See also Table D). They can be explained partly by population trends in some municipalities puting them in another category. In addition, traffic densities at the selected locations have an effect. These may also have developed differently in the course of time. Besides which, substitute or supplementary locations were used at which the densities may have differed from those of the original places. Lastly, it is not ruled out that discontinuance of the surveys in 1973 after 7 weekends and the introduction of an improved reweighting procedure, also in 1973, brought about a minor change in the composition of the (reweighted) sample.
Apart from this, the implications of the differences are insignificant: There is no correlation between size of municipality and BAC, though there is between regional area and BAC; but the changes in the sample as between regional areas occurred mostly prior to the change in the law on 1st November 1974.

4.4. Statistical analysis

For statistical testing of differences in BAC distribution between the years, the number of BAC classes had to be reduced, especially because other variables are involved in the comparison as well.
For that purpose the BAC distribution was simplified to four classes: < 20 mg, 20 - 50 mg; 50 mg - 100 mg and > 100 mg/100 ml. It was firstly verified whether the numbers of subjects in the BAC classes differed, taking into account the reweighting factor per subject. The difference is expressed as a χ^2 value with the appropriate number of degrees of freedom and level of significance. It was then determined which relations between the four BAC classes specially contribute to any significant effect. The classes can be subdivided into two groups in a number of ways. A special effect then corresponds to each subdivision. Next, each of the two groups was again divided in two until each class has been tested seperately against one or more other classes. The BAC classes for example were always compared as follows: first, BAC < 20 mg/100 ml was compared with > 20 mg/100 ml, then 20 mg - 50 mg with > 50 mg and lastly 50 - 100 mg with > 100 mg/100 ml. By no means all classes have been compared thus directly with one another, while each successive comparison is based on fewer observations (in this case subjects) than the preceding one and hence must differ more greatly before it is statistically significant. The result of each comparison is given in the form of a z-value with the appropriate level of significance.
Next, it was examined whether the BAC distribution differed for the various years. It was first examined whether there was a difference in the number of subjects per year, again allowing for the reweighting factors (which cannot provide any conclusions of interest in this case).
For this purpose, the years must also be divided into two groups each time. First, 1975 was compared with 1973 + 1971 + 1970, next 1973 with 1971 + 1970 and finally 1971 with 1970. Then it was checked whether there is a relationship between BAC distribution and years. All possible two-by-two comparisons were also made, starting with < 20 mg/100 ml against > 20 mg/100 ml for 1975 as against 1973 + 1971 + 1970 and ending with 50 mg/100 ml as against > 100 mg/100 ml for 1971 as against 1970.

1970	Unweighted					Reweighted				
Size of municipality	North	East	West	South	Total	North	East	West	South	Total
Large towns	—	—	7	—	7	—	—	18	—	18
Medium-sized towns	4	7	21	7	38	4	10	22	9	46
Small towns	6	9	9	18	43	4	5	8	12	30
Rural areas	6	2	3	3	12	2	2	2	1	7
Total	13	19	40	28	100	10	17	50	23	100
1971										
Large towns	—	—	7	—	7	—	—	15	—	15
Medium-sized towns	4	7	20	7	37	4	10	22	9	45
Small towns	6	9	10	15	40	5	6	8	12	30
Rural areas	3	3	3	6	15	2	2	2	4	9
Total	13	20	40	28	100	11	17	47	24	100
1973										
Large towns	—	—	10	—	10	—	—	19	—	19
Medium-sized towns	4	6	20	6	36	4	10	23	6	43
Small towns	7	10	11	17	44	4	5	9	14	33
Rural areas	1	3	3	4	12	—	2	2	2	6
Total	11	19	45	27	100	8	18	52	22	100
1975										
Large towns	—	—	9	—	9	—	—	19	—	19
Medium-sized towns	4	5	17	7	33	4	8	18	9	39
Small towns	6	8	13	20	47	3	5	12	14	34
Rural areas	4	4	1	1	11	3	3	1	1	8
Total	14	17	40	28	100	10	16	50	24	100

Table D. Distribution of motorists by size of municipality and regional area (unweighted and reweighted)

The analysis did not include 1974 because that survey was too limited in its nature as compared with the other years.

Finally, this analysis included another one or two other variables in the same way so that the principal effect of these and also their interactions with the other variables were examined, and also the contribution of specific combinations of classes.
With still more variables the numbers of subjects per specific combination would become too small. Besides this, significant interactions of still more variables are difficult to interpret. With small numbers, the reliability of the estimate of the effects is too slight.
For the time being it is nog yet possible to test for a connection between two variables while eliminating the effect of a third variable on the two other variables. In this research, this applies for example to the variables BAC, time and origin which are all interrelated. The relation between origin and BAC was, however, checked for various times.
The analysis method has been described in detail by J. de Leeuw & S. Oppe (1976).

Analysis was limited for the time being to a number of variables expected to have a pronounced effect on BAC, or an effect of which on the BAC would have practical implications, or with which a change in BAC distribution since the change in the law might be related. This choice was largely based on the results of multivariate analysis of the 1971 material.
The variables are: time of evening, day of week, trip departure point (origin), age and sex of motorist, day of weekend, regional area and size of municipality. These variables were subdivided into a maximum of five classes, after which the relevant combinations of the variables were analysed. The X^2-values of interesting principal effects or interactions were determined together with the contribution by the specific combinations of classes in the form of z-values (as far as significant at the 1% level).

5. Results

Figure 1 gives cumulative percentage distributions per year with class intervals of 10 mg/100 ml. For this, the research results were reweighted with reference to the volume of traffic.
The lower limit for establishing whether or not the driver had been drinking was set at 20 mg/100 ml. Below this it cannot be stated with certainty that a breath or blood sample contains alcohol due to drinking. Within the group with a BAC lower than 20 mg/100 ml, however, a distinction can be made between motorists who said they had not drunk any alcohol and those who had drunk at least one glass in the evening. Subjects whose BAC was not known were disregarded in 1975 (and in 1974). In the other years they were included in the group with BAC's below 20 mg/100 ml.

For 1975, Figure 1 shows that 44% of motorists with a BAC below 20 mg/100 ml said they had not consumed any alcohol that evening; 36% with a BAC below 20 mg/100 ml said they had had a drink that evening. 20% had a BAC higher than 20 mg/100 ml, including for instance 9% with more than 50 mg/100 ml; 5% of all motorists had a BAC higher than 80 mg/100 ml, including 3% with more than 100 mg/100 ml.

1974 data relate solely to the combined results for the two weekends after 1st November, i.e. after the change in the law. The curve for 1974 clearly shows that drinking by motorists was then much less than in preceding years.
The more gradual trend of the curve for 1973 and 1971 indicates that in those years alcohol consumption was greater than in the other years. There was apparently also more drinking in 1970 than in 1975. But the differences are slighter.

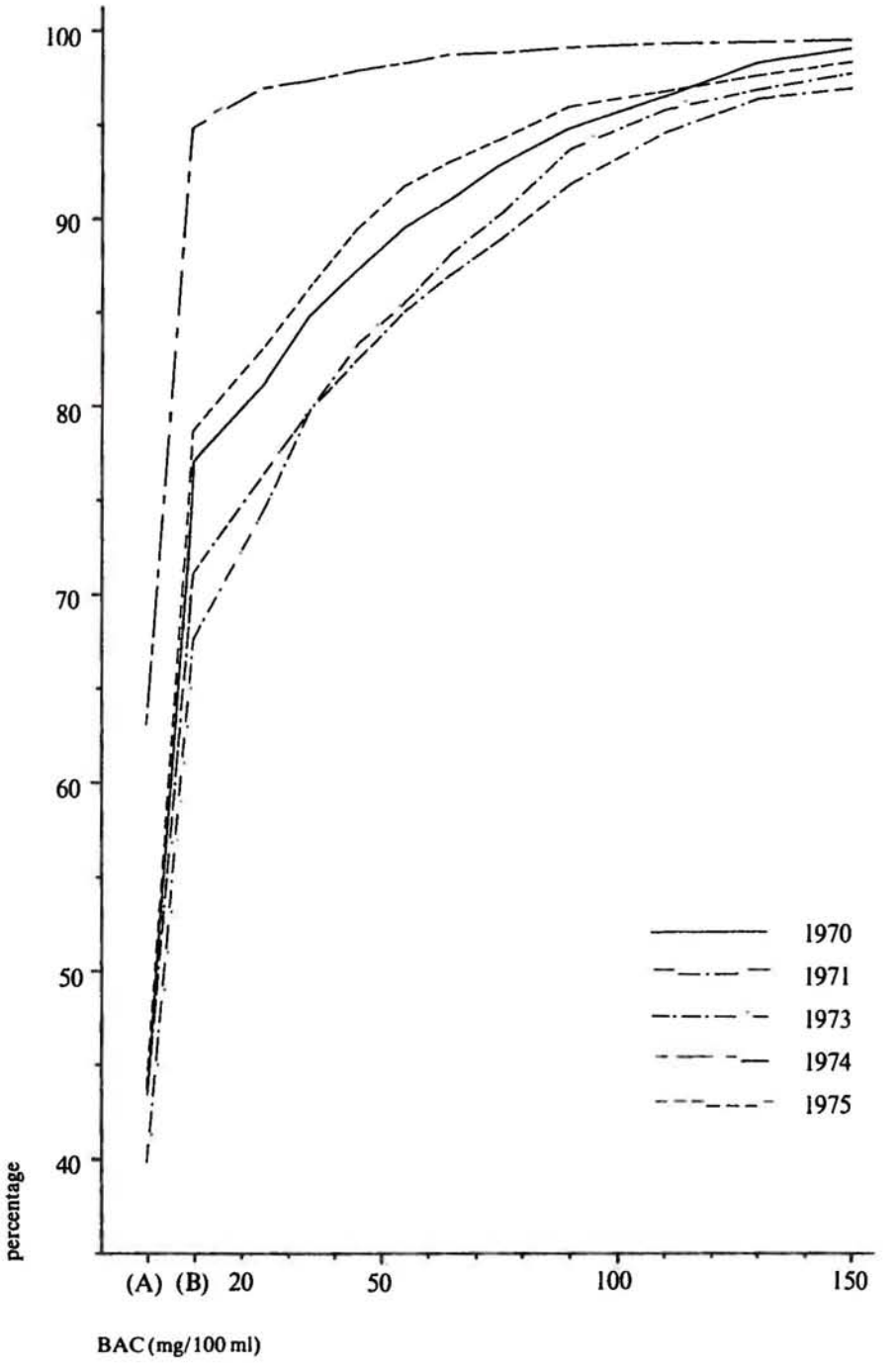

Figure 1. Cumulative percentage distribution per year
(A) No drinking
(B) Drinking

6. Discussion of results with reference to a statistical analysis

6.1. Explanation

The following shows the results in the form of bar diagrams and as horizontal and vertical percentage tables subdividing the BAC into four classes. Both forms of presentation require some explanation.

To compare drinking in the various years, the percentage distribution of the four different BAC classes can be examined per year and be presented as figures and tables.

If a third variable, such as time, is added to the variables year and BAC, various possibilities of presentation arise.
1. The distribution of BAC classes can be presented individually per year for each of the three two-hour periods. This has been done in the figures with bar diagrams and in the horizontal percentage tables. For simplicity, the figures include three years only. It can be seen from these whether drinking by the group of motorists from one two-hour period differs from the other periods. This has to be done for each year individually. A comparison can also be made between the years as regards drinking by motorists for one of the two-hour periods at a time. The percentages for different BAC classes can simply be added together.
2. This presentation does not yet indicate how motorists in a given BAC class are divided over the three two-hour periods in each year. To make this possible, the vertical percentage tables have been given. The assumption is that it is more important to know the distribution for all motorists with a BAC $>$ 20 mg/100 ml or $>$ 50 mg/100 ml than for motoristis with BAC 20 - 50 mg/100 ml or 50 - 100 mg/100 ml. The tables show, for instance, what percentage of motorists with a BAC $>$ 50 mg/100 ml were found in a given year either before or after midnight.
3. Lastly, it can easily be calculated from a combination of horizontal and vertical percentage tables what percentage of all weekend-night motorists consists of drivers with a given BAC at a given time.

By adding a fourth variable, such as the day, presentation of the results becomes so complicated that the figure shows only the 1975 results and the tables are split into sub-tables for each seperate year. For 1975, extra tables are added giving the distribution of motorists with BAC $>$ 20 mg/100 ml, and $>$ 50 mg/100 ml and $>$ 100 mg/100 ml respectively, for both day and time. The variables time and day can, of course, be replaced by others; year and BAC are always of importance.

The differences in drinking before and after the change in the law on 1st November 1974 and the relations between a number of other variables and drinking are discussed below. The figures, but especially the tables, however, contain far more information than can be stressed in this discussion.

6.2. **Results**

6.2.1. *Year*

From 1970 to 1973 there was increasing drinking by drivers. Although in 1973, as compared with 1971 and 1970, the percentage of drinking drivers was greater, the BAC's were not as high. In the last weekend before 1st November 1974, drinking had already decreased as compared with previous years (Table 2 and Figure 2).
The 1974 results were not included in the statistical tests. It can nevertheless be said that immediately after the change in the law in November 1974 there were practically no drinking drivers at weekend nights. It is difficult to say what the 1975 pattern would have been without the 1974 change in the law. At least the 1973 level of drinking could have been expected however. The 1975 level was in fact even slightly below the 1970 level.

6.2.2. *Time*

This decrease may be either due to more moderate drinking or to a change in the composition of traffic as regards characteristics relating to drinking by drivers. The latter might be the case, for example, if late-night traffic densities in 1975 had greatly decreased compared with previous years. But this was not the case. There was even a slight increase in late-night traffic densities as compared with the early evening. It is not possible to ascertain whether overall traffic densities differ as between the years (Table 1).

The later the hour, the higher the percentage of motorists who have been drinking and the higher the BAC's (Table 2). Of motorists with a BAC > 100 mg/100 ml in 1975, 19% were encountered between 22.00 and 24.00 hours and 43% between 02.00 and 04.00 hours. But the traffic density distribution was: 55% between 22.00 and 24.00, 33% between 24.00 and 02.00 and only 12% between 02.00 and 04.00 hours (Table 1).

The reduction in drinking by motorists in 1975 as compared with 1973, 1971 and 1970 was not the same throughout the night. After midnight, the reduction was slightly greater than before. Nevertheless, in 1975 between 02.00 and 04.00 hours, 24% of all motorists still had a BAC > 50 mg/100 ml, including 11% with > 100 mg/100 ml. About 35% had > 20 mg/100 ml (Table 2 and Figure 3).

6.2.3. *Day*

Traffic density distribution over the night differs on Friday, Saterday and Sunday. On Saturday night there is busy traffic late into the night. On Sunday it quiets down quite early. The increase in the course of the years in late-night traffic densities as compared with early evening applies especially to Friday and Saturday. Moreover, in 1975 traffic density on Saturday night as a whole increased further still as compared with Friday and Sunday. Overall traffic density on Friday and Sunday night is about the same (Table 1).

Drinking on the three evenings differs mainly shortly after midnight. On Sunday night at time there is a lower percentage of drinking drivers than on Friday and Saturday. But the BAC levels are relatively higher (Table 3a to d and Figure 4).
In 1975, the 43% motorists with a BAC > 100 mg/100 ml between 02.00 and 04.00 hours were divided into 19% on Friday and 15% and 9% on Saturday and Sunday night respectively. One of the reasons for this is that since the change in the law there was less drinking on Saturday and Sunday night (Table 4).

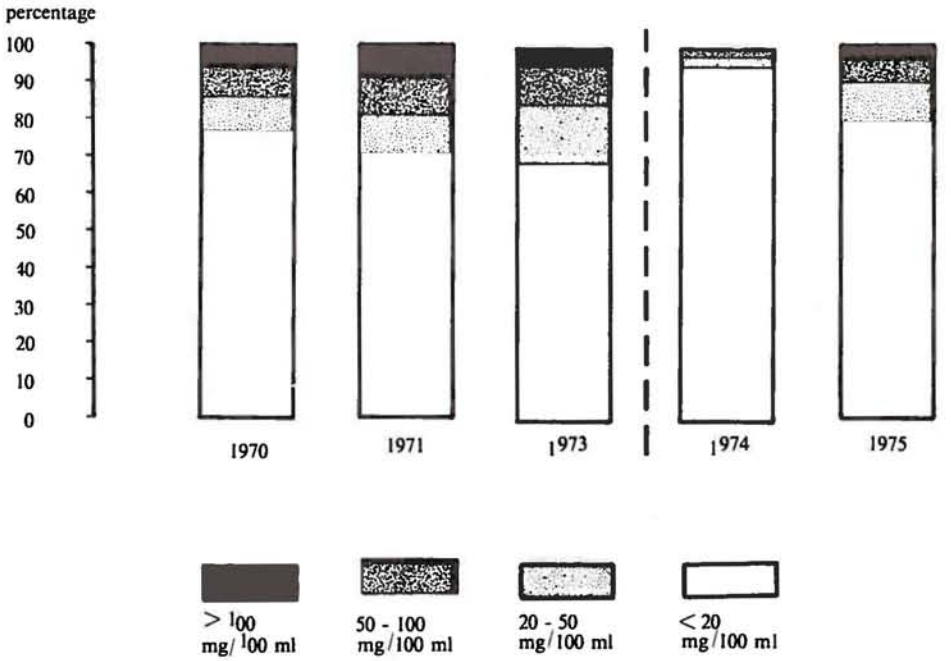

Figure 2. BAC distribution by year

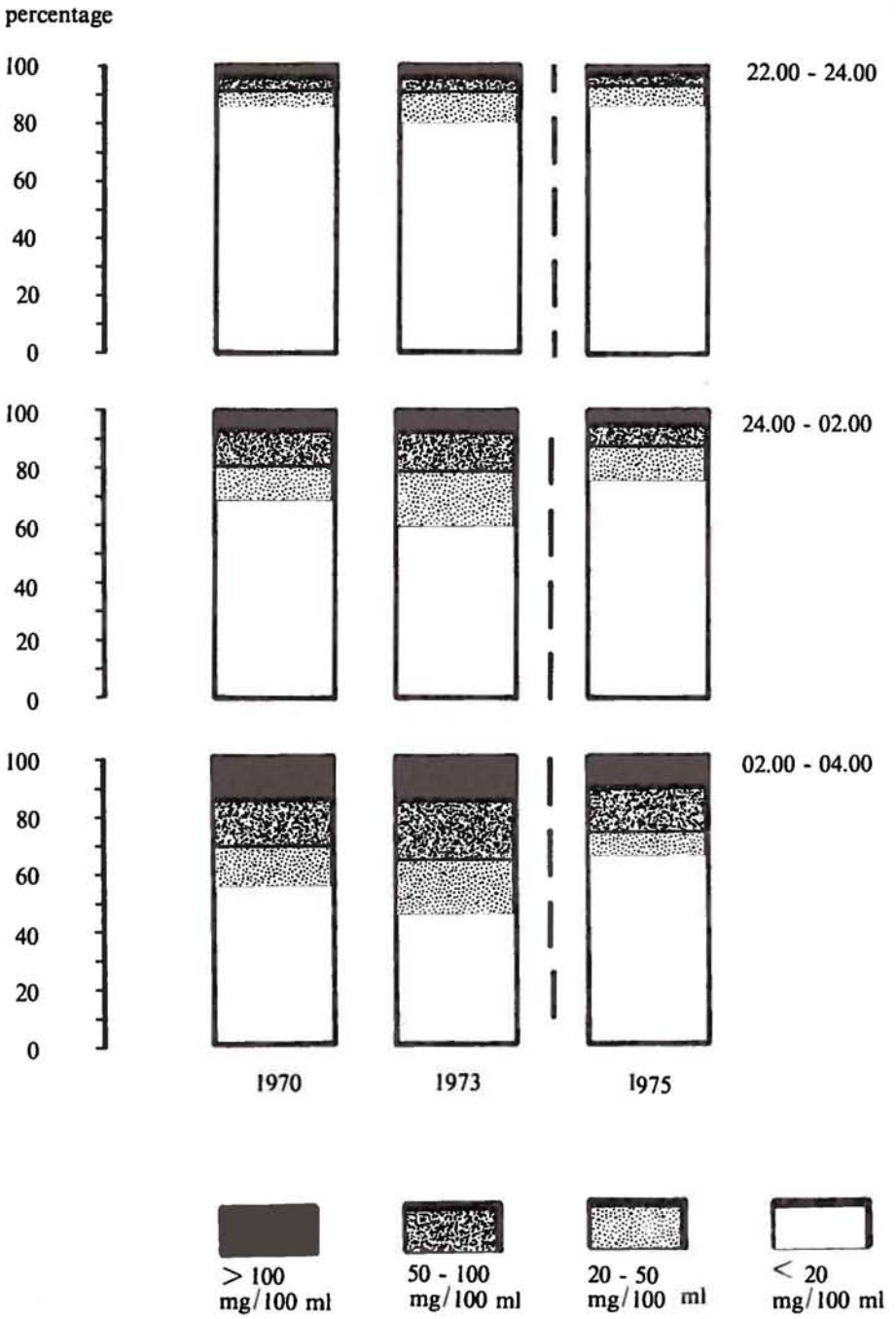

Figure 3· BAC distribution by year and time

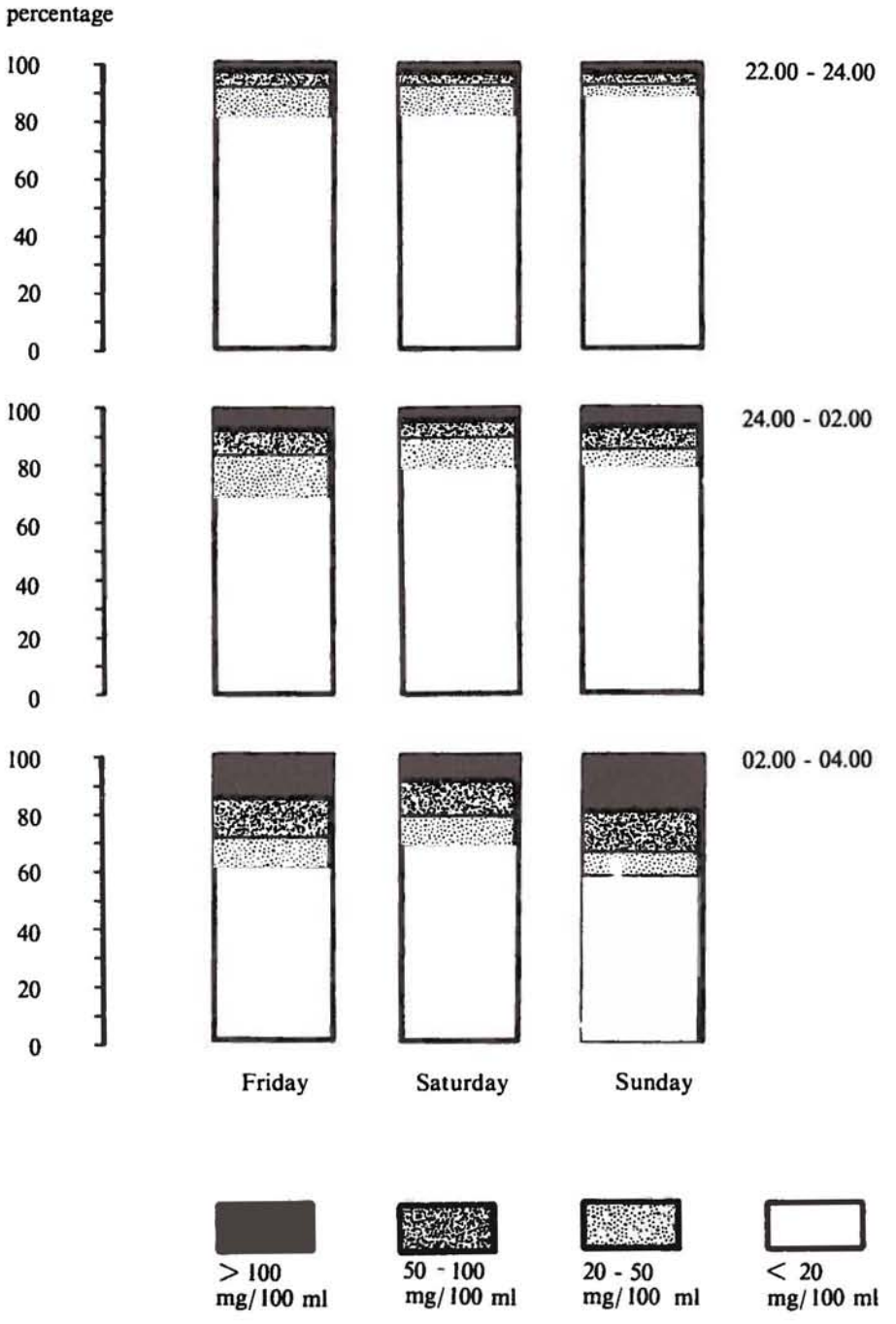

Figure 4· BAC distribution by day and time in 1975

6.2.4. *Trip origin*

During the night the traffic structure changes as regards motorists' trip origin. Relatively the largest group nearly always consists of motorists who have been visiting, but this decreases after 02.00 hours. Other groups that get smaller as it gets later are drivers coming from home or fetching someone or taking someone home. As against this, there are comparatively more motorists coming from catering establishments or parties (Table 5).

Traffic composition by trip origin changes quite a lot from year to year. For instance, in 1975 the 'catering establishment' category was smaller than in previous years. Moreover, these changes of trip origin vary somewhat according to the time of evening/night (Table 6).

Comparison of drinking by drivers according to trip origin has special relevance if made for separate times. Otherwise the relationship between drinking and trip origin would be confused with that between drinking and time.

The increase in drinking as the hour gets later is very clearly linked up with the motorist's trip origin. An important example is a comparison between the 'visiting' and the 'bar, pub' groups. The most striking feature is that during the entire night motorists coming from a catering establishment have drunk more, and more often. But whereas in the 'visiting' category drinking continues to increase throughout the night the later it gets, the increase in the 'catering establishment' group is relatively less by the end of the night. The difference in drinking between the 'visiting' group and the 'catering' group is therefore partly eliminated late in the night (Table 7a to d and Figures 5 and 6).

For 1975, this ultimately means: Early in the evening the number of motorists with a BAC > 20 mg/100 ml or > 50 mg/100 ml respectively returning from a visit is twice as large as that from catering establishments. At the end of the night the two groups are about the same size. This also applies to motorists with BAC > 100 mg/100 ml, except for the time between 24.00 and 02.00 hours, when the number of high-BAC motorists coming from catering establishments is nearly twice that from visits (Table 8).

Otherwise, there is no indication that the relationship between drinking and trip origin, whether or not in combination with the time, has been influenced over the years. The decrease in drinking since the change in the law therefore seems to be about the same for all groups of trip origins.

6.2.5. *Age*

Owing to the period of the surveys, many motorists under 35 were encountered. Moreover, the number of motorists aged 50 or older greatly decreases the later it gets. As against this, there is an increase in the 25 - 35 age group. Furthermore, in the course of the years there is a slight shift in the age structure: slightly fewer motorists under 25; rather more aged 50 or older. Apart from a high percentage of motorists between 25 and 35 at the end of the night in 1973, there were no movements in ages related to the year and time of surveys (Table 9).

In view of the above, therefore, it is again useful to compare drinking by age groups at separate times.

There are then indeed some differences in drinking as between age groups. It can be stated that at the beginning of the night the percentage of older motorists who have been drinking is clearly lower than that in other age groups. Among younger motorists, the percentage that had been drinking was somewhat larger shortly after midnight than

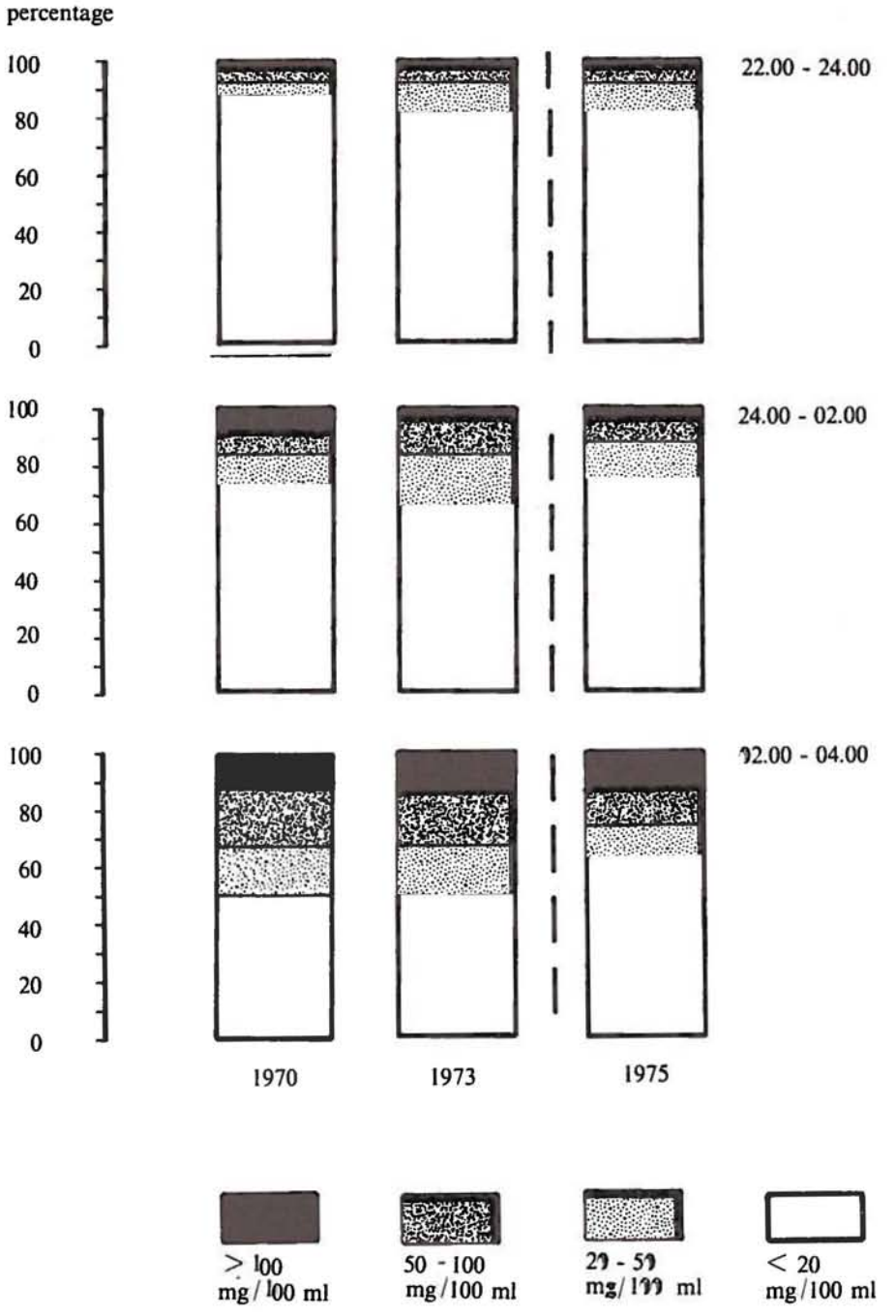

Figure 5. BAC distribution by year and time: visiting

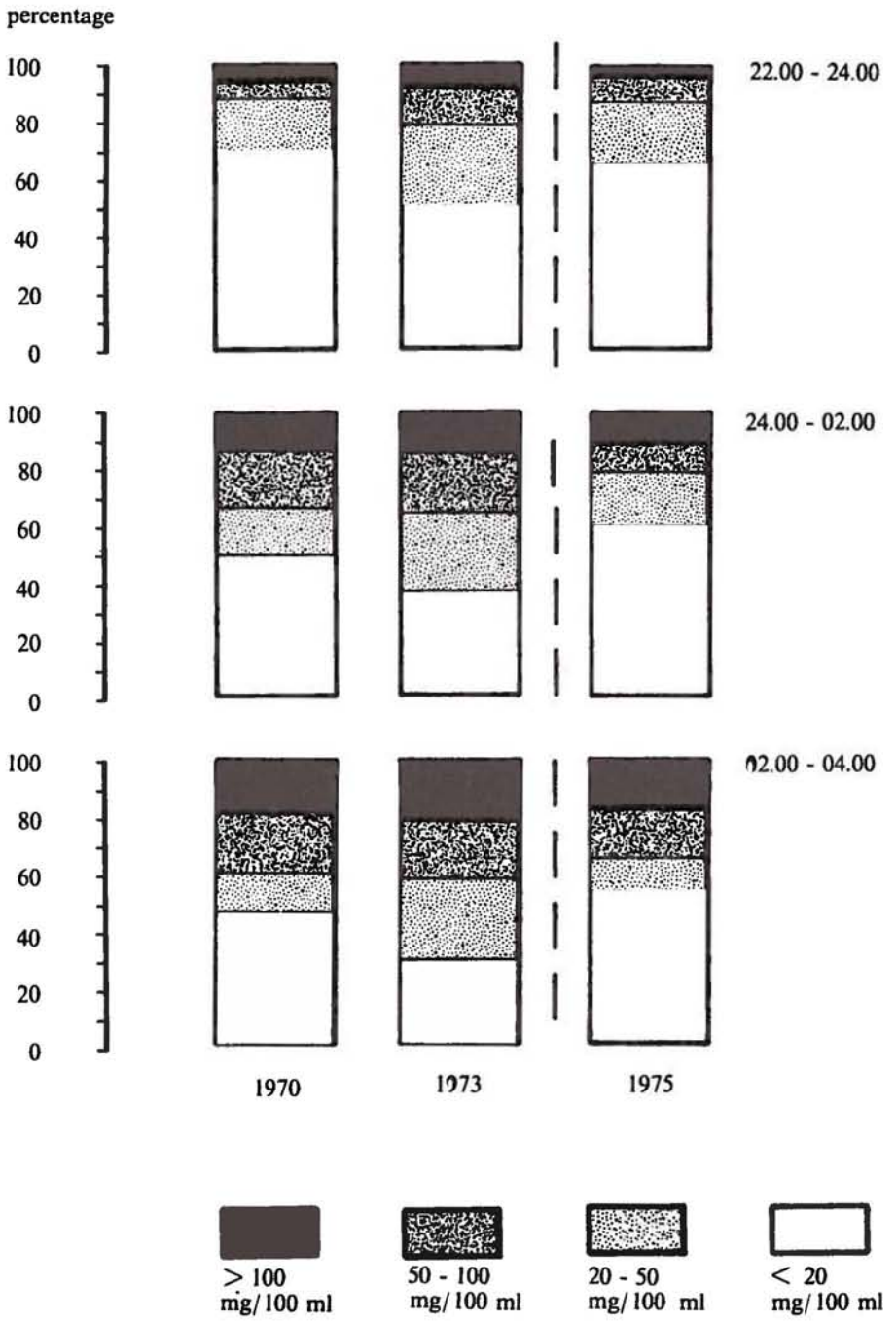

Figure 6· BAC distribution by year and time: catering establishment

in the other age groups; but later on the increase in drinking by them was not as great as in the other age groups. This thus means that because there are so many motorists under 35, motorists who have been drinking include a large number under 35 as well (Table 10a to d).

Of motorists with a BAC > 100 mg/100 ml in 1975, for instance, 34% were under 25 (these included 10% between 02.00 and 04.00) and another 40% between 25 and 35 (including 19% between 02.00 and 04.00 hours) (Table 11 and Figure 7). But it should not be concluded from this that motorists under 35 drink more, at least not as far as motorists during weekend nights are concerned.

Changes in drinking habits in the course of the years — since the change in the law too — have moreover been about the same for all ages.

6.2.6. *Sex*

Males form by far the greater proportion of motorists at weekend nights. But the percentage of females in 1975 (14%) was higher than in previous years (1973: 9%, 1971: 8%, 1970: 8%).

Among these women, the percentage that had been drinking was lower than among male drivers (Table 12 a to d and Figure 8). In 1975, too, the percentage of drinkers was lower than in previous years. But not only was drinking less frequent in 1975; the women who did drink, drank less.

In 1974 after the change in the law the percentage of women drivers was already higher during the surveys. This increase was probably due to the change in the law and to women taking over the wheel from men because the men had been drinking.

6.2.7. *Regional area and size of municipality*

In the West of the country, but even more so in the South, motorists drink more and more often than in the North and East. The South in this case means the provinces of Zeeland, Noord-Brabant and Limburg. It is noticeable, for instance, that in 1975 28% of all motorists in the sample who had been drinking came from the South; of those with a BAC > 50 mg/100 ml there were even 36%, and of those with > 100 mg/100 ml as many as 40%. Of all motorists — regardless of BAC — 24% come from the South (Tables 13a to d and 14).

The endeavour was to obtain a nationally representative sample, but not too much value should be attached to the distribution of drinking drivers (with BAC's > 20 mg/100 ml, > 50 mg/100 ml and > 100 mg/100 ml respectively) over both regional areas and sizes of municipalities.

Drinking changes somewhat from year to year depending on regional area and size of municipality. Apart from this there was no indication of any connection between size of municipality and BAC. Lastly, it was found that changes occurred during the years in the distribution of the sample of motorists over regional areas and sizes of municipalities (Table 15). In view of the intention of keeping the sample of municipalities and locations as constant as possible this had not really been expected. But these movements have little significance for findings about drinking by the sample of drivers as a whole.

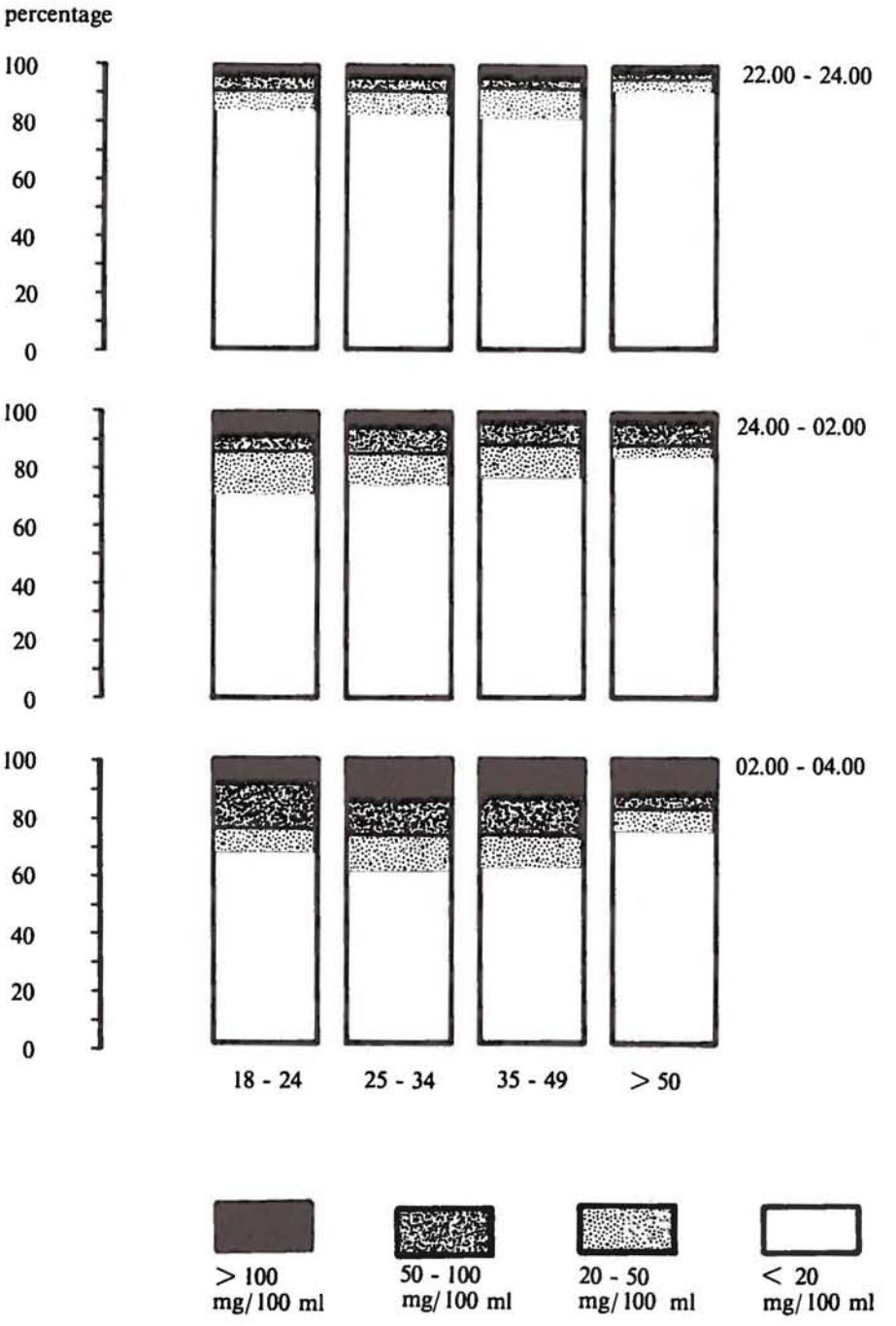

Figure 7. BAC distribution by age and time in 1975

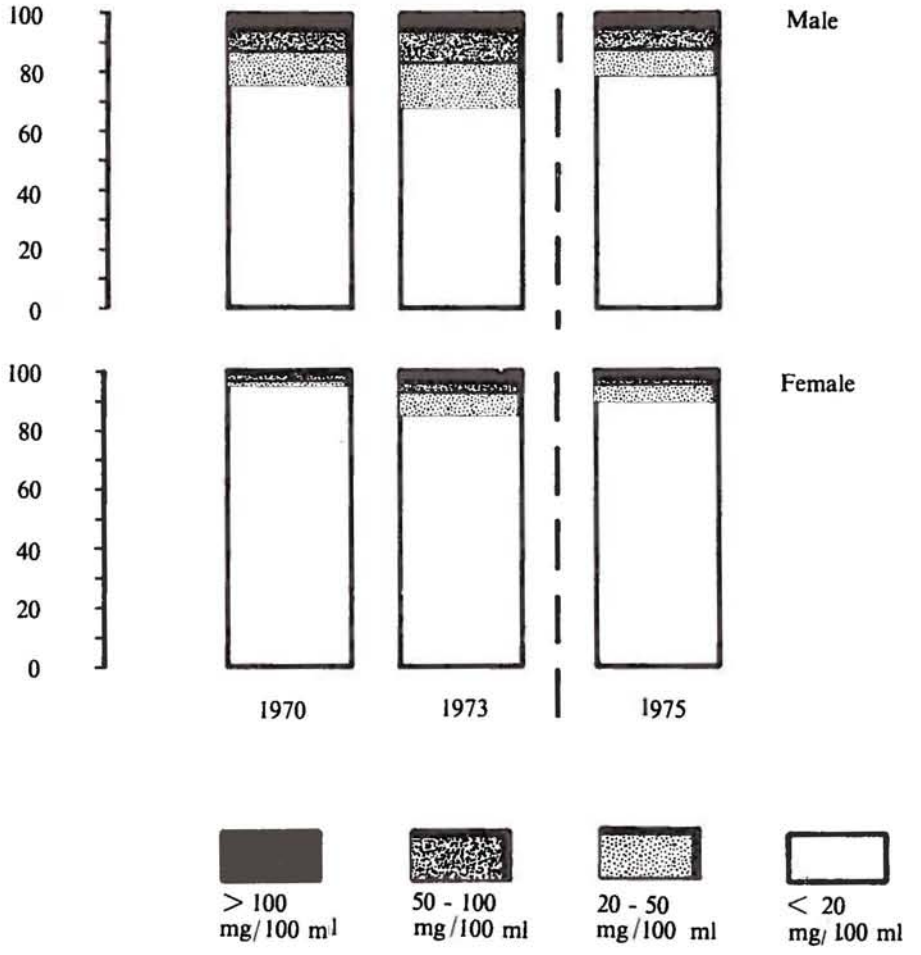

Figure 8. BAC distribution by year and sex

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Tables 1 - 15

1970				
Time	Friday	Saturday	Sunday	Total
22.00 - 24.00 hrs	61	48	69	59
24.00 - 02.00 hrs	30	38	24	31
02.00 - 04.00 hrs	9	13	7	10
Total	100	100	100	100
Total as horizontal percentages	33	37	30	100

1971				
22.00 - 24.00 hrs	60	47	69	58
24.00 - 02.00 hrs	30	38	25	31
02.00 - 04.00 hrs	11	15	6	11
Total	100	100	100	100
Total as horizontal percentages	32	37	31	100

1973				
22.00 - 24.00 hrs	55	45	71	56
24.00 - 02.00 hrs	32	39	25	32
02.00 - 04.00 hrs	12	16	4	11
Total	100	100	100	100
Total as horizontal percentages	33	34	32	100

1975				
22.00 - 24.00 hrs	55	45	71	55
24.00 - 02.00 hrs	31	40	24	33
02.00 - 04.00 hrs	14	16	5	12
Total	100	100	100	100
Total as horizontal percentages	31	41	29	100

Table 1. Distribution of motorists by time of day

1970	(A)					(B)			
Time	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
22.00 - 24.00 hrs	86	8	4	2	100	65	36	28	27
24.00 - 02.00 hrs	69	13	12	7	100	28	44	47	43
02.00 - 04.00 hrs	54	15	17	14	100	7	20	25	29
Total	78	10	8	5	100	100	100	100	100
1971									
22.00 - 24.00 hrs	82	9	5	4	100	66	37	31	27
24.00 - 02.00 hrs	61	15	13	11	100	27	43	45	47
02.00 - 04.00 hrs	47	15	20	18	100	7	21	24	26
Total	72	12	9	8	100	100	100	100	100
1973									
22.00 - 24.00 hrs	80	13	6	2	100	65	38	30	21
24.00 - 02.00 hrs	59	20	14	7	100	28	42	44	43
02.00 - 04.00 hrs	45	19	20	16	100	7	20	26	36
Total	69	16	10	5	100	100	100	100	100
1974									
Total	80	8	9	3	100				
1974[2]									
Total	95	3	1	—	100				
1975									
22.00 - 24.00 hrs	85	10	4	1	100	59	41	30	19
24.00 - 02.00 hrs	76	13	8	4	100	31	38	39	38
02.00 - 04.00 hrs	65	11	13	11	100	10	21	31	43
Total	80	11	6	3	100	100	100	100	100

Table 2. Year x Time x BAC

(A) Distribution over BAC classes by time and year
(B) Distribution over times by BAC group and year
(1) last weekend before 1st November
(2) two weekends after 1st November

Friday	(A)					(B)			
Time	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
22.00 - 24.00 hrs	84	10	4	2	100	67	42	32	33
24.00 - 02.00 hrs	68	15	12	5	100	27	41	44	38
02.00 - 04.00 hrs	55	14	18	13	100	7	17	24	30
Total	77	12	8	4	100	100	100	100	100
Saturday									
22.00 - 24.00 hrs	84	8	4	4	100	55	30	27	30
24.00 - 02.00 hrs	69	14	10	7	100	36	46	45	39
02.00 - 04.00 hrs	54	14	17	15	100	10	24	29	30
Total	74	11	8	7	100	100	100	100	100
Sunday									
22.00 - 24.00 hrs	90	5	4	1	100	76	38	32	13
24.00 - 02.00 hrs	67	10	14	9	100	19	44	51	60
02.00 - 04.00 hrs	54	19	13	13	100	5	18	17	27
Total	82	7	7	3	100	100	100	100	100

Table 3a. Day x Time x BAC in 1970

(A) Distribution over BAC classes by time and day in 1970
(B) Distribution over times by BAC group and day in 1970

Friday	(A)					(B)			
Time	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
22.00 - 24.00 hrs	82	10	4	4	100	67	39	30	29
24.00 - 02.00 hrs	63	14	11	12	100	26	40	43	44
02.00 - 04.00 hrs	47	13	21	19	100	7	21	27	27
Total	73	12	8	8	100	100	100	100	100
Saturday									
22.00 - 24.00 hrs	79	10	8	4	100	55	30	29	25
24.00 - 02.00 hrs	62	16	14	8	100	35	34	43	43
02.00 - 04.00 hrs	46	17	21	16	100	10	25	28	32
Total	67	13	12	7	100	100	100	100	100
Sunday									
22.00 - 24.00 hrs	85	7	5	3	100	78	42	35	28
24.00 - 02.00 hrs	56	13	16	16	100	19	45	51	53
02.00 - 04.00 hrs	48	14	14	24	100	4	13	14	19
Total	75	9	8	8	100	100	100	100	100

Table 3b. Day x Time x BAC in 1971

(A) Distribution over BAC classes by time and day in 1971
(B) Distribution over times by BAC group and day in 1971

Friday	(A)					(B)			
Time	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
22.00 - 24.00 hrs	81	11	5	3	100	63	37	32	40
24.00 - 02.00 hrs	63	21	13	3	100	29	42	37	23
02.00 - 04.00 hrs	49	16	24	11	100	9	22	31	37
Total	71	15	10	4	100	100	100	100	100
Saturday									
22.00 - 24.00 hrs	81	11	6	1	100	57	24	18	8
24.00 - 02.00 hrs	55	24	14	7	100	33	50	48	43
02.00 - 04.00 hrs	42	22	18	18	100	8	26	34	49
Total	65	18	11	6	100	100	100	100	100
Sunday									
22.00 - 24.00 hrs	78	15	6	1	100	76	57	38	23
24.00 - 02.00 hrs	61	11	16	11	100	21	36	51	64
02.00 - 04.00 hrs	52	12	20	16	100	3	7	11	13
Total	73	14	9	5	100	100	100	100	100

Table 3c. Day x Time x BAC in 1973

(A) Distribution over BAC classes by time and day in 1973
(B) Distribution over times by BAC group and day in 1973

Friday	(A)					(B)			
Time	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
22.00 - 24.00 hrs	82	12	6	1	100	60	39	32	12
24.00 - 02.00 hrs	69	17	9	5	100	28	38	36	39
02.00 - 04.00 hrs	60	12	14	14	100	11	22	32	49
Total	75	13	8	4	100	100	100	100	100
Saturday									
22.00 - 24.00 hrs	83	13	4	1	100	47	36	25	17
24.00 - 02.00 hrs	79	12	7	2	100	40	40	40	33
02.00 - 04.00 hrs	69	11	13	7	100	14	24	35	50
Total	79	12	6	2	100	100	100	100	100
Sunday									
22.00 - 24.00 hrs	89	6	4	1	100	75	52	43	32
24.00 - 02.00 hrs	79	8	8	5	100	22	34	38	38
02.00 - 04.00 hrs	58	9	14	18	100	4	14	19	30
Total	85	7	5	3	100	100	100	100	100

Table 3d. Day x Time x BAC in 1975

(A) Distribution over BAC classes by time and day in 1975
(B) Distribution over times by BAC group and day in 1975

BAC > 20 mg/100 ml				
Time	Friday	Saturday	Sunday	Total
22.00 - 24.00 hrs	15	16	11	41
24.00 - 02.00 hrs	14	17	7	38
02.00 - 04.00 hrs	8	10	3	21
Total	37	42	21	100
BAC > 50 mg/100 ml				
22.00 - 24.00 hrs	11	8	11	30
24.00 - 02.00 hrs	14	15	9	39
02.00 - 04.00 hrs	12	14	5	31
Total	38	37	25	100
BAC > 100 mg/100 ml				
22.00 - 24.00 hrs	4	5	10	19
24.00 - 02.00 hrs	17	10	11	38
02.00 - 04.00 hrs	19	15	9	43
Total	40	30	30	100

Table 4. BAC x Time x Day in 1975

1970			
Trip origin	22.00 - 24.00 hrs	24.00 - 02.00 hrs	02.00 - 04.00 hrs
Visiting	43	50	35
Public house, bar	16	24	34
Party	1	2	4
Job	10	8	14
Other	30	16	14
Total	100	100	100

1971			
Visiting	41	42	27
Public house, bar	15	26	32
Party	4	7	14
Job	9	9	11
Other	32	18	16
Total	100	100	100

1973			
Visiting	41	42	25
Public house, bar	10	26	37
Party	5	7	12
Job	10	9	11
Other	34	16	15
Total	100	100	100

1975			
Visiting	47	50	38
Public house, bar	9	19	25
Party	2	6	7
Job	8	6	14
Other	34	19	16
Total	100	100	100

Table 5. Distribution of motorists by trip origin and time

Trip origin	22.00 - 24.00 hrs	24.00 - 02.00 hrs	02.00 - 04.00 hrs
Visiting	47	50	38
Public house	4	8	9
Bar, etc.	6	11	16
Party	2	6	7
Catering job	—	1	5
Job, meeting	8	6	9
From home	15	7	5
Collecting/taking home	11	7	6
Other	8	5	7
Total	100	100	100

Table 6. Distribution of motorists by trip origin and time in 1975

22.00 - 24.00 hrs	(A)					(B)			
Trip origin	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
Visiting	89	5	4	2	100	45	34	43	35
Public house, bar	71	19	7	3	100	13	33	27	19
Party	100	—	—	—	100	1	—	—	—
Job	87	6	2	4	100	10	9	10	19
Other	89	7	2	2	100	31	23	20	27
Total	86	8	4	2	100	100	100	100	100
24.00 - 02.00 hrs									
Visiting	74	12	8	6	100	54	41	38	45
Public house, bar	51	17	21	11	100	17	37	43	40
Party	49	27	11	13	100	2	3	3	3
Job	77	5	14	4	100	9	6	8	5
Other	76	14	8	2	100	18	12	9	15
Total	69	13	12	7	100	100	100	100	100
02.00 - 04.00 hrs									
Visiting	50	17	19	14	100	32	38	37	34
Public house, bar	48	14	20	18	100	30	38	41	43
Party	44	11	19	26	100	3	5	6	7
Job	65	15	11	10	100	17	11	9	9
Other	73	13	7	7	100	19	8	6	7
Total	54	15	17	14	100	100	100	100	100

Table 7a. Time x Trip origin x BAC in 1970

(A) Distribution over BAC classes by trip origin and time in 1970
(B) Distribution over categories of trip origin by BAC group and time in 1970.

22.00 - 24.00 hrs	(A)					(B)			
Trip origin	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
Visiting	85	9	4	2	100	43	34	27	25
Public house, bar	55	22	13	11	100	10	37	40	44
Party	71	15	7	7	100	3	7	6	8
Job	89	5	3	3	100	9	6	6	7
Other	90	4	4	2	100	35	18	21	17
Total	82	9	5	4	100	100	100	100	100
24 00 - 02.00 hrs									
Visiting	64	18	12	6	100	42	38	30	22
Public house, bar	45	15	18	23	100	19	36	43	53
Party	59	16	11	14	100	7	7	7	8
Job	72	7	12	9	100	11	6	8	7
Other	72	11	11	6	100	22	12	12	10
Total	61	15	13	11	100	100	100	100	100
02.00 - 04.00 hrs									
Visiting	46	17	17	20	100	26	27	26	29
Public house, bar	32	14	29	24	100	22	41	44	42
Party	45	16	22	17	100	14	14	14	13
Job	63	12	15	12	100	15	7	8	7
Other	65	17	9	9	100	23	10	8	8
Total	47	15	2	18	100	100	100	100	100

Table 7b. Time x Trip origin x BAC in 1971

(A) Distribution over BAC classes by trip origin and time in 1971
(B) Distribution over categories of trip origin by BAC group and time in 1971

22.00 - 24.00 hrs	(A)					(B)			
Trip origin	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
Visiting	83	11	5	1	100	42	35	32	18
Public house, bar	52	30	13	6	100	7	24	24	34
Party	57	31	3	9	100	4	11	7	24
Job	88	5	5	3	100	11	6	10	16
Other	85	9	6	—	100	36	23	26	8
Total	80	13	6	2	100	100	100	100	100
24.00 - 02.00 hrs									
Visiting	67	20	12	2	100	48	34	28	10
Public house, bar	37	26	21	15	100	16	40	45	62
Party	54	25	17	4	100	6	8	7	5
Job	67	16	8	9	100	11	7	8	9
Other	72	12	11	5	100	19	11	12	12
Total	59	20	14	7	100	100	100	100	100
02.00 - 04.00 hrs									
Visiting	51	18	19	13	100	28	22	22	21
Public house, bar	31	28	20	21	100	25	47	42	49
Party	45	12	28	15	100	12	12	14	12
Job	56	12	22	10	100	13	9	10	7
Other	65	8	15	12	100	21	10	11	11
Total	45	19	20	16	100	100	100	100	100

Table 7c. Time x Trip origin x BAC in 1973

(A) Distribution over BAC classes by trip origin and time in 1973
(B) Distribution over categories of trip origin by BAC group and time in 1973

22.00 - 24.00 hrs	(A)					(B)			
Trip origin	BAC (mg/100 ml)					BAC (‰)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
Visiting	84	11	5	1	100	46	50	51	43
Public house, bar	66	22	9	3	100	7	20	20	24
Party	85	13	2	—	100	2	2	1	—
Job	92	7	1	1	100	8	4	3	5
Other	90	6	3	1	100	36	23	25	28
Total	85	10	4	1	100	100	100	100	100
24.00 - 02.00 hrs									
Visiting	76	14	18	2	100	50	51	45	30
Public house, bar	61	19	10	10	100	15	31	34	55
Party	80	7	11	3	100	6	5	8	5
Job	87	9	2	2	100	7	3	2	4
Other	88	6	5	1	100	22	10	10	8
Total	76	13	8	4	100	100	100	100	100
02.00 - 04.00 hrs									
Visiting	64	12	13	11	100	38	39	38	39
Public house, bar	55	13	16	17	100	21	32	34	37
Party	76	6	8	9	100	9	5	5	6
Job	63	12	15	10	100	13	15	14	12
Other	80	7	10	4	100	20	9	9	6
Total	65	11	13	11	100	100	100	100	100

Table 7d. Time x Trip origin x BAC in 1975

(A) Distribution over BAC classes by trip origin and time in 1975
(B) Distribution over categories of trip origin by BAC group and time in 1975

BAC > 20 mg/100 ml				
Trip origin	22.00 - 24.00 hrs	24.00 - 02.00 hrs	02.00 - 04.00 hrs	Total
Visiting	20	19	8	48
Public house, bar	9	12	7	27
Other	12	7	6	25
Total	41	38	21	100

BAC > 50 mg/100 ml				
Visiting	15	17	12	44
Public house, bar	6	13	10	30
Other	9	8	9	26
Total	30	39	31	100

BAC > 100 mg/100 ml				
Visiting	8	11	17	36
Public house, bar	5	21	16	41
Other	6	6	10	23
Total	19	38	43	100

Table 8. BAC x Trip origin x Time in 1975

1970			
Age	22.00 - 24.00 hrs	24.00 - 02.00 hrs	02.00 - 04.00 hrs
< 25 y	32	35	35
25 - 35 y	29	31	37
35 - 50 y	24	23	21
> 50 y	15	12	7
Total	100	100	100

1971			
< 25 y	33	33	34
25 - 35 y	29	35	38
35 - 50 y	25	21	22
> 50 y	14	10	6
Total	100	100	100

1973			
< 25 y	29	33	27
25 - 35 y	30	30	48
35 - 50 y	24	25	20
> 50 y	17	12	6
Total	100	100	100

1975			
< 25 y	28	32	30
25 - 35 y	30	36	39
35 - 50 y	23	20	24
> 50 y	20	12	7
Total	100	100	100

Table 9. Distribution of motorists by age group and time

22.00 - 24.00 hrs	(A)					(B)			
Age	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
< 25 y	88	7	4	1	100	33	28	27	16
25 - 35 y	87	9	1	3	100	29	27	19	40
35 - 50 y	84	9	7	1	100	24	28	32	14
> 50 y	85	6	5	4	100	15	16	22	30
Total	86	8	4	2	100	100	100	100	100
24.00 - 02.00 hrs									
< 25 y	69	14	12	5	100	35	34	32	26
25 - 35 y	70	13	11	6	100	32	29	29	28
35 - 50 y	63	15	12	10	100	21	27	28	34
> 50 y	73	10	10	7	100	12	10	11	13
Total	69	13	12	7	100	100	100	100	100
02.00 - 04.00 hrs									
< 25 y	63	13	12	12	100	40	29	27	29
25 - 35 y	47	17	21	15	100	32	43	43	40
35 - 50 y	53	14	16	17	100	21	22	23	26
> 50 y	57	16	14	12	100	7	7	6	6
Total	54	15	17	14	100	100	100	100	100

Table 10a. Time x Age x BAC in 1970

(A) Distribution over BAC classes by age and time in 1970
(B) Distribution over age groups by BAC group and time in 1970

22.00 - 24.00 hrs	(A)					(B)			
Age	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
< 25 y	79	12	6	4	100	31	38	35	35
25 - 35 y	82	8	6	4	100	29	29	31	30
35 - 50 y	84	7	6	4	100	25	22	27	25
> 50 y	88	8	3	2	100	15	10	7	8
Total	82	9	5	4	100	100	100	100	100
24.00 - 02.00 hrs									
< 25 y	59	16	13	12	100	33	35	34	36
25 - 35 y	55	15	17	13	100	32	41	43	41
35 - 50 y	66	14	9	10	100	23	18	17	19
> 50 y	74	12	9	5	100	13	7	6	4
Total	61	15	13	11	100	100	100	100	100
02.00 - 04.00 hrs									
< 25 y	54	16	16	14	100	40	28	27	27
25 - 35 y	41	12	23	24	100	33	41	47	50
35 - 50 y	46	19	19	16	100	22	25	22	19
> 50 y	42	19	27	13	100	5	7	6	4
Total	47	15	20	18	100	100	100	100	100

Table 10b. Time x Age x BAC in 1971

(A) Distribution over BAC classes by age and time in 1971
(B) Distribution over age groups by BAC group and time in 1971

22.00 - 24.00 hrs	(A)					(B)			
Age	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
< 25 y	78	13	7	1	100	28	31	31	16
25 - 35 y	78	14	7	1	100	29	33	32	21
35 - 50 y	81	10	4	5	100	25	23	29	63
> 50 y	84	12	4	—	100	18	14	9	—
Total	80	13	6	2	100	100	100	100	100
24.00 - 02.00 hrs									
< 25 y	56	22	13	9	100	31	35	34	45
25 - 35 y	55	22	17	6	100	29	33	33	27
35 - 50 y	61	16	17	6	100	26	24	27	22
> 50 y	73	18	7	3	100	14	8	6	5
Total	59	20	14	7	100	100	100	100	100
02.00 - 04.00 hrs									
< 25 y	49	17	23	11	100	29	25	25	19
25 - 35 y	40	21	19	20	100	42	52	52	61
35 - 50 y	50	13	24	12	100	22	18	20	16
> 50 y	56	25	7	12	100	7	5	3	5
Total	45	19	20	16	100	100	100	100	100

Table 10c. Time x Age x BAC in 1973

(A) Distribution over BAC classes by age and time in 1970
(B) Distribution over age groups by BAC group and time in 1973

22.00 - 24.00 hrs	(A)					(B)			
Age	BAC (mg/100 ml)					BAC (mg/100 ml)			
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100
< 25 y	85	9	6	1	100	28	28	35	11
25 - 35 y	83	11	5	2	100	29	34	37	42
35 - 50 y	82	13	3	2	100	22	26	20	40
> 50 y	91	6	2	—	100	22	11	7	8
Total	85	10	4	1	100	100	100	100	100
24.00 - 02.00 hrs									
< 25 y	72	16	5	7	100	31	37	33	59
25 - 35 y	76	12	10	3	100	36	37	41	33
35 - 50 y	78	14	8	1	100	20	18	16	7
> 50 y	86	5	9	1	100	13	7	10	2
Total	76	13	8	4	100	100	100	100	100
02.00 - 04.00 hrs									
< 25 y	68	9	15	8	100	32	27	28	23
25 - 35 y	62	13	13	13	100	37	42	41	45
35 - 50 y	63	11	14	12	100	23	25	25	26
> 50 y	75	9	6	11	100	8	5	5	7
Total	65	11	13	11	100	100	100	100	100

Table 10d. Time x Age x BAC in 1975

(A) Distribution over BAC classes by age and time in 1975
(B) Distribution over age groups by BAC group and time in 1975

BAC > 20 mg/100 ml				
Age	22.00 - 24.00 hrs	24.00 - 02.00 hrs	02.00 - 04.00 hrs	Total
< 25 y	11	14	6	31
25 - 35 y	14	14	9	37
35 - 50 y	11	7	5	23
> 50 y	5	3	1	9
Total	41	38	21	100

BAC > 50 mg/100 ml				
< 25 y	10	13	9	32
25 - 35 y	10	16	13	39
35 - 50 y	7	6	8	21
> 50 y	3	4	1	8
Total	30	39	31	100

BAC > 100 mg/100 ml				
< 25 y	2	22	10	34
25 - 35 y	8	12	19	40
35 - 50 y	8	3	11	21
> 50 y	1	1	3	5
Total	19	18	43	100

Table 11. BAC x Age x Time in 1975

1970	(A)					(B)				
Sex	BAC (mg/100 ml)					BAC (mg/100 ml)				
	< 20	20-50	50-100	> 100	Total	< 20	> 20	> 50	> 100	Total
Males	76	11	8	5	100	90	95	97	100	92
Females	87	10	3	1	100	10	5	3	—	8
Total	78	10	8	5	100	100	100	100	100	100
1971										
Males	70	12	10	8	100	90	97	97	98	92
Females	90	4	4	2	100	10	3	3	2	8
Total	72	12	9	8	100	100	100	100	100	100
1973										
Males	68	16	11	5	100	89	95	96	95	91
Females	85	10	3	3	100	11	5	4	5	9
Total	69	16	10	5	100	100	100	100	100	100
1975										
Males	78	11	7	4	100	84	91	97	97	86
Females	88	11	1	1	100	16	9	3	3	14
Total	80	11	6	3	100	100	100	100	100	100

Table 12. Year x Sex x BAC

(A) Distribution over BAC classes by sex and year
(B) Distribution over sexes by BAC group and year

North	(A)				
Size of municipality	BAC (mg/100 ml)				
	< 20	20 - 50	50 - 100	> 100	Total
Large towns	—	—	—	—	—
Medium sizes towns	84	5	5	6	100
Small towns	84	7	5	4	100
Rural areas	84	6	6	4	100
Total	84	6	5	5	100
East					
Large towns	—	—	—	—	—
Medium sized towns	86	8	4	2	100
Small towns	80	6	10	4	100
Rural areas	67	27	5	1	100
Total	83	9	6	2	100
West					
Large towns	75	12	10	3	100
Medium sized towns	78	9	7	6	100
Small towns	74	11	9	6	100
Rural areas	76	13	7	4	100
Total	77	9	8	6	100
South					
Large towns	—	—	—	—	—
Medium sized towns	74	13	6	7	100
Small towns	73	11	9	7	100
Rural areas	73	18	4	3	100
Total	73	12	8	7	100

Table 13a. Regional area x Municipality size x BAC in 1970

(A) Distribution over BAC classes by size of municipality and regional area in 1970

North	(A)				
Size of municipality	BAC (mg/100 ml)				
	< 20	20-50	50-100	> 100	Total
Large towns	—	—	—	—	—
Medium sized towns	66	17	10	7	100
Small towns	79	7	6	8	100
Rural areas	77	11	6	6	100
Total	74	12	7	7	100
East					
Large towns	—	—	—	—	—
Medium sized towns	68	13	10	9	100
Small towns	76	13	7	4	100
Rural areas	74	15	4	7	100
Total	71	13	8	7	100
West					
Large towns	79	4	10	7	100
Medium sized towns	71	13	9	7	100
Small towns	77	11	7	5	100
Rural areas	60	21	13	6	100
Total	71	13	8	7	100
South					
Large towns	—	—	—	—	—
Medium sized towns	61	15	14	10	100
Small towns	68	10	12	10	100
Rural areas	71	12	10	7	100
Total	66	12	12	10	100

Table 13b. Regional area x Municipality size x BAC in 1971

(A) Distribution over BAC classes by size of municipality and regional area in 1971

North	(A)				
Size of municipality	BAC (mg/100 ml)				
	< 20	20-50	50-100	> 100	Total
Large towns	—	—	—	—	—
Medium sized towns	75	14	5	6	100
Small towns	77	14	4	5	100
Rural areas	68	15	7	10	100
Total	75	14	5	5	100
East					
Large towns	—	—	—	—	—
Medium sized towns	61	25	4	10	100
Small towns	66	18	11	5	100
Rural areas	71	13	7	9	100
Total	64	21	7	8	100
West					
Large towns	74	12	11	3	100
Medium sized towns	71	14	11	4	100
Small towns	67	21	9	3	100
Rural areas	72	13	14	1	100
Total	70	16	11	4	100
South					
Large towns	—	—	—	—	—
Medium sized towns	66	13	16	5	100
Small towns	66	15	14	5	100
Rural areas	68	15	7	10	100
Total	66	14	14	6	100

Table 13c. Regional area x Municipality size x BAC in 1973

(A) Distribution over BAC classes by size of municipality and regional area in 1973

North	(A)				
Size of municipality	BAC (mg/100 ml)				
	< 20	20-50	50-100	> 100	Total
Large towns	—	—	—	—	—
Medium sized towns	88	8	3	1	100
Small towns	85	7	6	2	100
Rural areas	79	10	7	4	100
Total	84	8	5	2	100
East					
Large towns	—	—	—	—	—
Medium sized towns	85	10	4	1	100
Small towns	82	12	4	2	100
Rural areas	83	11	5	2	100
Total	84	11	4	1	100
West					
Large towns	77	14	6	3	100
Medium sized towns	80	10	6	3	100
Small towns	80	11	7	2	100
Rural areas	75	18	4	3	100
Total	79	12	6	3	100
South					
Large towns	—	—	—	—	—
Medium sized towns	74	9	12	4	100
Small towns	77	11	7	6	100
Rural areas	74	9	15	2	100
Total	76	10	9	5	100

Table 13d. Regional area x Municipality size x BAC in 1975

(A) Distribution over BAC classes by size of municipality and regional area in 1975

BAC > 20 mg/100 ml					
Size of municipality	North	East	West	South	Total
Large towns	—	—	21	—	21
Medium sized towns	2	6	17	11	36
Small towns	2	4	12	16	34
Rural areas	3	2	1	1	8
Total	7	12	51	28	100

BAC > 50 mg/100 ml					
Large towns	—	—	17	—	17
Medium sized towns	2	5	18	15	40
Small towns	2	3	11	19	35
Rural areas	4	2	—	2	8
Total	8	10	46	36	100

BAC > 100 mg/100 ml					
Large towns	—	—	16	—	16
Medium sized towns	1	3	19	12	35
Small towns	2	3	9	27	41
Rural areas	4	2	1	1	8
Total	7	8	45	40	100

Table 14. BAC x Municipality size x Regional area in 1975

1970

Size of municipality	North	East	West	South	Total
Large towns	—	—	18	—	18
Medium sized towns	4	10	22	9	46
Small towns	4	5	8	12	30
Rural areas	2	2	2	1	7
Total	10	17	50	23	100

1971

Large towns	—	—	15	—	15
Medium sized towns	4	10	22	9	45
Small towns	5	6	8	12	30
Rural areas	2	2	2	4	9
Total	11	17	47	24	100

1973

Large towns	—	—	19	—	19
Medium sized towns	4	10	23	6	43
Small towns	4	5	9	14	33
Rural areas	—	2	2	2	6
Total	8	18	52	22	100

1975

Large towns	—	—	19	—	19
Medium sized towns	4	8	18	9	39
Small towns	3	5	12	14	34
Rural areas	3	3	1	1	8
Total	10	16	50	24	100

Table 15. Distribution of motorists by municipality size and regional area