

Analysis of "Near Accident" Reports

COMMITTEE ON ROAD USER CHARACTERISTICS, T. W. Forbes, Chairman¹

This was a pilot study to investigate information on driver behavior and other factors as causes of accidents obtainable from reports of accidents that almost happened ("near accidents"). Such reports have the advantage that drivers who were almost involved can describe what happened without fear of legal consequences. They may also be less disturbed by emotional factors known to interfere with accurate reporting of actual accidents.

A total of 179 "near accident" reports were obtained from 400 sets of report forms distributed. Reports were largely from people interested or working with traffic. The "other" drivers included, however, should represent a more random sample of drivers. The sample of "near accidents" and drivers, therefore, is not necessarily a representative cross-section. Also their dramatic quality may result in certain "near accidents" being remembered and reported in preference to other less dramatic ones.

However, the study does indicate what can be achieved by this method of research. It does allow indication by the drivers of important factors of the situation at the time. This makes possible selection of important combinations of factors and elimination of much irrelevant (and therefore confusing) material often automatically included in large samples of accident report data.

The results indicate the importance of numerous combinations of human and physical factors, 2 to 7 or more factors being of importance in most of the "near accidents." Only 2 of the 179 were attributed to a single factor and even these might include other factors. Speeds ranged from stopped to 65 mph and, in many cases were not indicated to have been of major importance. "Hurry," however, occurred with both lower and higher speeds and occurred in a larger proportion of "near accidents" than would be expected by chance.

Thus the study shows why the search for single accident causes has not been generally successful in uncovering fundamental causes of accidents. The number or relative proportion of specific causal factors reported is not necessarily representative. Rather the variety and types of factor combinations are of importance as is the illustration that the method can be used fruitfully.

● ALTHOUGH entirely too large from any other point of view, the number of traffic accidents in any practical period of time has been too small to allow reliable analysis of accident causes from accident records. Furthermore, certain information has been difficult to obtain from those involved in actual accidents due to fear of legal complications.

¹The members of the Committee circulated report forms to drivers in various parts of the country and it is a pleasure to acknowledge their contribution and that of those who filled out and submitted reports.

The initial stages of the analyses were made possible through clerical assistance contributed by the National Research Council "Council-wide" Committee on Highway Safety Research when the chairman was its Technical Director. Clerical and secretarial assistance and time of the chairman for drafting of the report were made available by the American Institute for Research, Pittsburgh, since he joined its staff.

The chairman carried out or supervised and is, therefore, responsible for the analysis, conclusions and interpretations, which do not necessarily represent those of individual committee members of National Research Council Organizations, nor of the American Institute for Research. The report, however, has been reviewed by the Committee and suggestions have been incorporated. Publication was recommended to suggest and stimulate further research along such lines.

TABLE 1
AGE OF REPORTING DRIVERS

Age	Private Drivers		Commercial Drivers	Total Drivers
	Men	Women		
15-19	1	0	0	1
20-24	4	2	0	6
25-29	3	1	7	11
30-34	9	2	6	17
35-39	13	1	9	23
40-44	2	0	6	8
45-49	8	1	3	12
50-54	11	0	0	11
55-59	5	0	7	12
60-64	1	0	0	1
65 and up	1	0	0	1
Unknown	15	1	3	19
Totals	73	8	41	122

forms were circulated by members of the committee a month or so later and (in order to increase the number of returns) a second set of forms was circulated by the members as directed by the committee after its January 1953 meeting.

METHOD

For the description of each "near accident," a report form (see Appendix) was drawn up which called for (a) a brief description of what happened (b) the reporter's opinion as to factors of most importance and (c) check list items on "hurry," attention, and month, season and day of the accident. In addition, a letter giving the purpose of the study and requesting cooperation included name, age, occupation, driving experience, city and state. The latter items were for determining the characteristics of the reporting sample and it was indicated that they would be considered confidential. A sample form was filled out describing a "near accident" occurrence and packets of five forms, a sample form and the letter of instructions were clipped together for distribution to each person.

With each packet of report forms was included a stamped envelope addressed to the chairman of the committee. It was requested that all forms be sent to him direct so that there would be no influence on reports from any possible fear that friends and colleagues would see them before they were sent in.

The twenty committee members each undertook to distribute forms to ten individual drivers who had sufficient interest and objectivity to report reliably. Each committee member distributed five additional sets of forms the second year. In addition, forms were distributed to a group of bus drivers and commercial fleet supervisors by certain members of the committee.

A total of 179 reports of "near accident" occurrences were received from a total of 122 drivers out of the total of approximately 400 sets of forms distributed. The number of reports from each individual were for the most part one or two with a few contributing three or four.

CHARACTERISTICS OF THE REPORTING SAMPLE

The individuals who sent in reports constituted, of course, a highly selected sample which cannot be considered a cross-section of the driving population as a whole.

² Through the National Research Council "Council-wide" Committee on Highway Safety Research from the experience of scientists in the field of aviation psychology.

A study of "near accidents" on the other hand does not meet with these difficulties since there are many more such occurrences and since drivers who have avoided accidents have no motivation for withholding information.

On the basis of successful studies of aircraft "near accidents," it was suggested² that the committee might well initiate such a study of traffic accidents to investigate what information could be obtained on accident causes by this method. Accordingly, at its January 1952 meeting, such a study was authorized. Report

TABLE 2
DRIVING EXPERIENCE OF REPORTING DRIVERS

Years	Private Drivers		Commercial Drivers	Total Drivers
	Men	Women		
0-3	1	1	0	2
4-7	0	1	4	5
8-11	3	2	4	9
12-15	6	0	3	9
16-19	6	2	0	8
20-23	5	0	2	7
24-27	2	0	2	4
28-31	10	0	2	12
32-35	7	0	4	11
36-41	3	1	1	5
Unknown	21	1	4	26
Totals	64	8	26	98

Miles Thousands	Private Drivers		Commercial Drivers	Total Drivers
	Men	Women		
25-99	4	0	0	4
100-199	2	0	3	5
200-399	1	0	5	6
400-599	1	0	2	3
600 and over	1	0	5	6
Totals	9	0	15	24

TABLE 3
OCCUPATIONS OF REPORTING DRIVERS

Occupations	Private Drivers		Commercial Drivers
	Men	Women	
Bus operator	0	0	20
Fleet supervisor, garage manager, etc.	0	0	6
Safety manager, supervisor, etc.	0	0	8
Accounting and clerical	3	4	0
Engineering including traffic and transportation	19	0	0
Education and administration	13	1	1
Research and administration	12	1	0
Industrial Administration and personnel	1	0	3
Editorial	0	1	0
Business and insurance	3	0	0
Unknown	22	1	3
Totals	73	8	41

TABLE 4
VEHICLES INVOLVED

Vehicles Involved	Private Drivers	Commercial Drivers	Total
Truck	1	1	2
Bus	0	3	3
Auto	106	16	122
Truck and auto	22	2	24
Bus and auto	2	21	23
Truck, bus, train and auto (various combinations)	1	7	8
Totals	132	50	182

TABLE 5
NUMBER OF VEHICLES

Total Vehicles	Private Drivers	Commercial Drivers	Total
One	16	5	21
Two	62	30	92
Three	25	9	34
Four	4	3	7
Five and over	2	0	2
"Several"	8	2	10
Line of traffic	9	1	10
Totals	126	50	176

The results of the study, therefore, are suggestive only. However, it should be pointed out that many of the reported occurrences involved a like number of other drivers, who should be a more random group.

Tables 1 and 2 show that the ages of those reporting ranged from below 20 to over 65 years and that their driving experience ranged from 2 to over 40 years. Some of the

commercial drivers reported experience in hundred thousands of miles.

Occupations of the reporting drivers were for the most part clerical, semi-professional and professional. The commercial vehicle operators and transportation fleet supervisors were mentioned above (see Table 3).

CHARACTERISTICS OF THE "NEAR ACCIDENT" OCCURRENCES

Certain physical characteristics reported throw some light on the sample of incidents obtained. Taken as a whole, these indicate a wide range of variables such as location, type of maneuver included, type vehicles involved, range of speeds and times of day and season of the year.

"Near accidents" involving passenger cars only, constituted by far the largest proportion of reports with combinations of truck and auto (including semi-trailer) and truck and bus the next largest. By far the largest number of reports involved two vehicles with three vehicles and single vehicle being next most frequent in that order (see Tables 4 and 5).

Speeds of the reporting driver's vehicles ranged from "stopped" to 65 to 70 mph with the occurrences pretty well spaced over the speed range as shown in Table 6. There was some peaking at the 50 to 55 mile speed for private driver reports which probably reflected the usual cruising speed of passenger cars in many states. In about one third of the reports, speed was not stated since it did not play a major part in the occurrence. In the remainder "high speed" or "too fast" were mentioned in a total of 18 cases only. This is of considerable interest since it means that in the descriptions, excessive speed or a speed "too fast" for conditions was reported as a cause in only about 10 percent of the reports.

Visibility conditions were good for the majority of the "near accidents" reported (see Table 7) and types of maneuvers involved were distributed among stopping, passing, turning and wide range of others (Table 8).

Table 9 shows the incidents to have been about equally located in urban and rural territory and to have been more frequent at intersections than on curves and hills. The remaining 80 incidents with location unstated would be assumed to be between intersections on streets or highways.

DRIVER'S OPINIONS AS TO CAUSES

The driver's opinions on factors of causal importance from Section B of the report blank were analyzed. Of the total 179 reports, 157 thought either self or other drivers to have been at fault. In about one third of the 157, the drivers reported themselves at fault either alone or together with another driver. Other dri-

TABLE 6
REPORTED SPEEDS

Driver's Car Speed	Private Drivers	Commercial Drivers	Total Reports
0-slow, stopping, starting	18	17	35
5-9	2	0	2
10-14	0	1	1
15-19	3	5	8
20-24	4	2	6
25-29	4	1	5
30-34	6	1	7
35-39	4	0	4
40-44	8	2	10
45-49	6	0	6
50-54	18	1	19
55-59	9	1	10
60-64	4	1	5
65-69	3	0	3
Unknown	35	11	46
"Too fast"	2	0	2
"Normal"	5	0	5
Totals	131	43	174

TABLE 7
VISIBILITY

Visibility Condition	Reported by		
	Private Drivers	Commercial Drivers	Total Reports
Twilight	10	2	12
Blind corner	12	1	13
Glare	5	1	6
Poor lighting	1	0	1
Rain	10	3	13
Fog	2	1	3
Snowing	1	0	1
Poor visibility	8	4	12
Good visibility	72	29	101
Totals	121	41	162

TABLE 8
TYPE OF MANEUVER

Type of Maneuver	Reported by		
	Private Drivers	Commercial Drivers	Total Reports
Backing	1	1	2
Stopping	19	8	27
Passing	33	12	45
Turning	29	15	44
Other (entering road, straight rear-end collision, off road, etc.)	66	22	88
Totals	148	58	206

TABLE 9
LOCATION

Location	Private Drivers	Commercial Drivers	Total Reports
Urban	32	30	62
Rural	64	15	79
Total	96	45	141
At intersection	40	23	63
Curve	17	3	20
Hill	15	1	16
Totals	72	27	99

TABLE 10
DRIVER'S OPINIONS ON CAUSAL FACTORS

Driver's Opinion as to Cause	Private Drivers	Commercial Drivers	Total Reports
At fault			
Self	39	14	53
Others	72	32	104
Totals	111	46	157
Poor visibility	9	0	9
"Hurry" as cause	5	6	11
Misjudgment			
Speed	6	2	8
Other's intent	8	2	10
Other	9	1	10
Inattention	27	17	44
Speed	31	9	40
No signal	14	3	17
Unexpected maneuver	20	3	23
Totals	129	43	172

vers were held to be at fault in 104 cases (Table 10).

This table also summarizes opinions as to factors of importance as causes. Poor visibility, hurry as a cause, and three types of misjudgment were noted about equally (less than 10 percent for each of these). "No signal" was mentioned somewhat more frequently, "unexpected maneuver," "inattention" and "speed" were mentioned most frequently, the latter two in almost 25 percent of the reports.

From no opinion to three causes for a given occurrence were reported by the different individuals.

These opinions, of course, cannot be taken at face value. It is of interest to compare them with the characteristics reported in describing the incidents and with those tabulated by the analyst in his independent review of the "near accidents" from the descriptions.

ANALYSIS OF BEHAVIOR AND CONDITIONS DESCRIBED

The characteristics described above gave the usual wide scatter of physical conditions and driver behavior which was not too enlightening. A further analysis of certain physical and behavior factors thought to be of probable importance was, therefore, undertaken. The attempt was made to include combinations of these factors rather than to classify into a single cause thought to be most important. The item on "hurry" was from the check list section of the report form. The other items were obtained by reviewing an abstract of the described occurrence and, in a large number of the cases, referring also to the original description.

BEHAVIOR ANALYSIS RESULTS

Number of Factors and Combinations

Only 2 of the 179 incidents reported could be classed as resulting from a single factor alone and even these might include other factors. These involved drivers apparently asleep or intoxicated who drifted off the road under conditions making improbable a collision with the reporting driver or anything else.

All other "near accidents" involved from 2 to 7 broad groups of factors operating simultaneously. Again the exact number depends on a judgment by the analyst.

Analysis Categories

Hurry
Misjudgment Factor
Unexpected Reaction
Speed of Maneuver
Visibility
Wet or Icy
Highway Design Factor

Driver Attitudes
Attention Factors
Fatigue, Sleep, Intoxication
Time of Day
Essentials of Maneuver
Remedial Action
Vehicle Maintenance Factor

It will be seen from the tables which follow that several of the seven factors included as many as 10 or 12 conditions or types of behavior. When it is considered that two such factors of 10 and 6 subdivisions, respectively, result in 60 combinations and that

TABLE 11
REPORTS OF "HURRY"

	Incidents Reported by				Drivers Involved	
	Private Drivers		Commercial Drivers	All Incidents	In Hurry	Not in Hurry
	Men	Women				
"In a hurry"						
Both drivers	16	3	6	25	50	-
Reporting driver only	12	1	2	15	15	15
Other driver only	41	2	26	69	69	69
Incidents involving hurry	69	6	34	109		
Neither "in a hurry"	50	4	16	70	-	140
Totals	119	10	50	179	134	224

adding a third factor with 10 categories results in 600 possible combinations, it is readily seen that the possible different combinations represented by 7 such factors are very numerous indeed.

Since this was not too large a sample of "near accidents" and other accident causing factors and combinations might be found in another sample. Thus it is easy to see why research on the causes of automobile accidents has been baffling, why combinations of behavior and of external conditions must be considered in research studies, and why classification into a single cause for each accident has failed to uncover basic causes satisfactorily.

HURRY HYPOTHESIS

From certain known results in experiments on judgments and from some practical opinions was derived the hypothesis that "hurry" on the part of one or more drivers might affect importantly the efficiency of driving behavior. Such "hurry" might be related to high speed or "speed too fast for conditions" or it might be independent of actual speed. It might have an effect on judgment, attention, foresight and planning in relation to both expected and unexpected situations. In order to test this hypothesis, a question on the report form asked whether the reporting driver himself was "in a hurry" and whether the other driver was judged to be "in a hurry" or not.

The behavior analysis was made separately for those cases with one or both drivers indicated as "in a hurry" and for those not so indicated. Analysis was carried out separately for men and women private drivers and for commercial drivers. The small number of women drivers and the range of factors led to combining data for all private drivers in many of the tables.

TABLE 12

HURRY OF REPORTING DRIVER COMPARED WITH OTHERS

"Hurry" and "Near Accidents"

Each reporting driver was asked to note whether he himself was "in a hurry" at the time and whether or not other drivers were. His estimate on the other driver might or might not be related to his own "hurry" or "non-hurry."

Table 11 shows the total incidents reported as involving one or both drivers "in a hurry" by men and women private drivers and by commercial drivers. The column headed "all incidents" shows that 109 out of the 179 incidents involved drivers "in a hurry." The last two columns indicate that 134 of the drivers involved

Contingency Table			
Other Driver	Reporting Driver		
	In Hurry	Not in Hurry	
In hurry	25 (21)	69 (73)	94
Not in hurry	15 (19)	70 (66)	85
Totals	40	139	179
Chi-square = 2.06, Df = 1, P = >.10			

were "in a hurry" and the remaining 224 were not so reported.

"Hurry" or "non-hurry" on the part of the reporting driver apparently did not influence reports on "hurry" of "other" drivers. Table 12 shows a contingency analysis which tests whether the numbers of "hurried" and "non-hurried" drivers in the four cells differ from an expected figure based on the proportion within the other group. A difference from the expected figures greater than might occur by chance would indicate either a positive or negative relationship between the reports on "self" and on the "other" driver. No such statistically significant difference was found.

However, over half of the "other" drivers in near accidents were reported "in a hurry." Is this a greater number than might occur by chance meeting of "hurried" and "unhurried" drivers on the road? Table 13 gives the results of a test of this question. The proportion of all drivers "in a hurry" was used as an estimate (even though one which may be biased—see below) of the proportion of such drivers on the road. The probability of "hurried" and "unhurried" drivers meeting by chance was used to compute expected numbers of near accident incidents (Expected A). Comparison of the actual with the chance expectancy figures showed more "hurry" among "other" drivers and less among those reporting than expected. The probability of obtaining such a difference by chance would be less than one in a hundred.

If there is the relationship between "hurry" and "near accidents" it may well be that the sample included a larger proportion of drivers "in a hurry" than the driving population at large. Therefore, a second figure (Expected B) was computed using a slightly lower proportion, i. e., one third. Results showed even more cases of "other" and "both" drivers above expectancy and a greater statistical significance.

These tables show that a large proportion of incidents involving drivers "in a hurry" means nothing of itself since the chance expectancy figures gave a similar over-all relationship. However, the greater than expected frequency of "other" drivers "in a

TABLE 13

INCIDENTS INVOLVING HURRY COMPARED WITH CHANCE EXPECTANCY
BASED ON PROPORTION OF DRIVERS IN A HURRY

Reported	Total Incidents	Expected A	Difference	Expected B	Difference
"In a hurry"					
Both drivers	25	25	0	19.89	5.21
Reporting driver only	15	42	-27	39.78	-24.78
Other driver only	69	42	+27	39.78	29.22
Neither	70	70	0	79.55	9.55
Totals		179		179.00	
Chi-square =			34.7		39.42
Df =			1		1
P =			<.01		<.01

Expected Number of Incidents Including

Other Driver	Reporting Driver	
	In a Hurry	Not in a Hurry
In a hurry	P1 ² . N	P1 P2. N
Not in a hurry	P1 P2. N	P2 ² . N

Where: P1 = proportion of all drivers "in a hurry"

P2 = proportion of all drivers "not in a hurry"

N = number of incidents

Expected A based on $P1 = \frac{134}{358}$; $P2 = \frac{224}{358}$ = sample proportions

Expected B based on $P1 = \frac{1}{3}$; $P2 = \frac{2}{3}$

TABLE 14
POOR VISIBILITY, SLIPPERY SURFACE, AND ROAD DESIGN

Condition	Incidents Involving Drivers		
	In a Hurry	Not in a Hurry	Both
Poor visibility (rain, fog, glare, angle of view, etc.)	23	15	38
Surface wet, slippery, icy	11	7	18
Road design factors (cross road on curve, sight distance, long no passing zone, dip, narrowing pavement)	44	17	61
Totals	78	39	117

TABLE 15
UNEXPECTED BEHAVIOR OR CONDITION

Condition	Incidents Involving Drivers		
	In a Hurry	Not in a Hurry	Both
Other driver's behavior:			
Slowed or stopped suddenly	12	8	20
Ran through red, stop turn or sign	11	1	12
Sudden turn, no warning	1	6	7
Turn opposite signal or from wrong lane	4	1	5
Faced by vehicle on wrong side	3	1	4
Sudden start from parked position	3	1	4
Sudden cut-in ahead of car	4	4	8
Passed car swerved	1	1	2
Behavior of animal or pedestrian:			
Animal or child ran onto road	1	4	5
Unexpected condition:			
New stop sign, new intersection	0	2	2
Blind crossing, train across road	0	1	1
Car without lights, dark night	1	0	1
Totals	41	30	71

"hurry" may be of significance and may indicate it as one factor in some types of "near accidents."

FACTORS IN CAUSAL COMBINATIONS

Possible relationships to "hurry" were investigated by tabulating other factors under a breakdown of "hurry" and "not in a hurry" (see Tables 14-18). To show a possible relationship to "hurry" the factor in question must occur in greater proportion than the ratio of total "hurry" to "non-hurry" incidents.

Table 14 shows that poor visibility, slippery surface and road design were judged of importance in 117 out of 179 incidents when taken in combination with other factors. Very few of these factors alone probably would have been sufficient as a cause. Note that "road design factors" (e. g., restricted sight distance, long no passing zone etc.) were a factor in more "hurry" accidents than the over-all 2 to 1 ratio would lead us to expect.

Table 15 shows 12 types of unexpected behavior or conditions which in combination with other factors appeared of causal importance. Again no one of these would have been sufficient alone. It will be noted that the largest group was sudden slowing or

sudden stopping. Only "running through the red," etc., was markedly greater for "hurry" incidents.

Factors of inattention, sleep and intoxication shown in Table 16 again indicated a range of conditions. Note that "probably inattentive" and "not alert" taken together and the category "distracted by passengers" were the two largest groups. Here the total incidents "in a hurry" and "not in a hurry" show about the 2 to 1 relationship of the sample and, therefore, indicate no particular relationship between "hurry" and these variables. The possible exception is "distracted by passengers" but 13 of these cases were reported by bus drivers. This probably represents a special problem introduced by other activities required of such drivers rather than a relationship to "hurry."

An analysis of misjudgment, errors of perception and "confusion" resulted in Table 17 which presents 10 more behavior sub-divisions which in combination with other factors were judged to be of causal significance. The totals for "hurry" and "not in a hurry" are in about the proportion of the total sample. However, judgment of passing

TABLE 16
INATTENTION, SLEEP AND INTOXICATION

Condition	Incidents Involving Drivers		
	In a Hurry	Not in a Hurry	Both
"Not alert," "asleep at the switch," etc.	7	3	10
Distracted by passengers, conversation, thinking of something else	20 ^a	8	28
Attention on signal, crossroad, etc., and "did not see car"	3	0	3
Probably inattentive	8	5	13
Asleep, fatigued, drowsy	5	4	9
Intoxicated	2	1	3
Probably drowsy or intoxicated	3	5	8
Totals	48	26	74

^a 13 of these were reported by bus drivers.

TABLE 17
MISJUDGMENT, ERRORS OF PERCEPTION, CONFUSED

	Incidents Involving Drivers		
	In a Hurry	Not in a Hurry	Both
Misjudged:			
Speed of turn or curve	3	1	4
Speed and rate of closing	6	4	10
Passing opportunity	13	1	14
Other driver's intended action	7	6	13
Slippery road condition	1	3	4
Seriousness of hazard	15	6	21
Illusory effects of relative speed, car hidden in dip, misinterpreted officer's signal	4	0	4
Confused by inadequate signs, construction, complex intersection, etc.	2	2	4
Semi-sleep, confused, wrong reaction	0	1	1
Poor choice of procedure (slippery, afraid to pull off, trailer on ice, blocking bus instead of to bus stop)	1	3	4
Totals	52	27	79

TABLE 18
ATTITUDES, EMOTIONAL BEHAVIOR AND DRIVING HABITS

	Incidents Involving Drivers		
	In a Hurry	Not in a Hurry	Both
"Pushing through"	43	4	47
Competitive (accelerated when passed)	1	0	1
Expected and took right of way (did not observe stop sign on through street, etc.)	1	3	4
"Irresponsible," or unaware of hazard	2	2	4
Faulty driving habits	9	9	18
Emotional behavior	3	1	4
Totals	59	19	78

opportunity, seriousness of hazard, and possibly one or two others show a sufficiently greater proportion to be of possible significance. For both groups together misjudgment of "speed and rate of closing" and of "other driver's intention" were also among the most frequent factors.

Analysis of reported attitudes, emotional behavior and driving habits shown in Table 18, contributed another 6 sub-categories. The table shows that for both groups together behavior classed as "pushing through" was the most frequent and that classed as "faulty driving habits" was second. Note also that "pushing through" was so disproportionate as to represent a highly probable relationship to drivers "in a hurry."

It is significant that these categories occurred in combination with speeds of 15 to 30 mph as well as with speeds on the open road under 50 and at 50 to 60 mph. Thus, it is clear that this attitude and its relationship to "hurry" were not at all the same thing as driving at high speed. Although this behavior occurred in some of the cases noted as "too fast for conditions" it also occurred in many other cases where speed as such was not given as a major factor in the description of the accident.

This characteristic picture of "pushing through" may have been one basis on which some reporting drivers checked the other driver as being "in a hurry." For reports of "hurry" on their own part, however, this was not the case and certainly not in cases where they checked neither driver "in a hurry."

The following examples of behavior classified as "pushing through," "emotional behavior" and "faulty driving habits" will indicate kinds of behavior included:

Examples of Behavior Classed as "Pushing Through"

Oncoming car passed line of traffic against oncoming traffic.
 Ran red signal or stop sign, squeezed through cross traffic, almost collided.
 Truck crossed center line to pass car stopped for left turn.
 Was passing and weaving in heavy traffic.
 Passed on upgrade with oncoming traffic.
 Passed on right when truck slowed to turn into driveway.
 Made overtake on rise and dip in face of oncoming car.
 Started before signal changed.
 Passed with oncoming car close.
 Turned corner in front and from left of starting bus.
 Crossed main highway, squeezed between bus and truck travelling fast on latter (opposite directions).
 Followed close, impatient to pass, squeezed by forcing other cars to stop or dodge by such maneuvers.

Examples of Behavior Classed as "Emotional"

Woman driver stopped on tracks in front of oncoming train to pick up an injured dog—then into a car and backed without looking into standing truck instead of proceeding ahead on open street.

Dashed into traffic from gas station—started engine in gear, shot out onto street—claimed due to upset from fight with wife.

Apparently angered, made hazardous pass, turned and glared. Later dashed into main highway between opposite fast approaching heavy vehicles.

Examples of Behavior Classed as "Faulty Driving Habits"

Stopped suddenly in traffic without signal.

Signalled turn after starting turn.

Looked back (for considerable period) while making pass or turn.

Did not check to rear before starting pass or turn.

Turned from wrong lane on multilane highway.

Travelled with wheel over center line.

Followed too close to large vehicle to see ahead.

Pulled into traffic from shoulder in front of fast traffic.

Started from curb while looking at passenger.

Changed mind (and direction) after starting a turn.

Combinations, e. g., turned from wrong lane without checking traffic from rear.

COMBINATIONS OF FACTORS

Although all possible combinations indicated earlier could not occur in our small sample of "near accidents," the very large number of combinations which did occur made it impractical to determine those most frequently found. It would be necessary to carry out a special study with a very much larger number of cases than this one in order to make such a determination.

The following illustrations, however, will perhaps show how the combination of factors may cause a "near accident" (and possibly an actual accident) although no one of the factors would be sufficient.

Example 1—Icy Road, Siren Not Heard, Misunderstanding or Misjudgment

Two cars approaching intersection at right driver angles, both at relatively slow speed, icy highway—one vehicle, an ambulance, other driver did not hear the siren, misunderstood the traffic officer's signal. The officer "ran for his life"—ambulance and car both tried to stop, skidded, missed each other.

Example 2—Slow Vehicle, Vehicle Condition, Driving Habit or Frustration, Error or Delay of Perception

Reporting driver traveling from 45 to 50 mph, met line of cars following truck, passing car with one head light out, glare, long "no passing" zone. Reporting driver raised own headlights, saw the oncoming pass, took to the shoulder and "missed by inches."

Example 3—Highway Design, Driving Habit, Inattention or Misjudgment by Each of Three Drivers

Reporting driver on rural highway, coming over hill which limited sight distance, saw two vehicles parked on right shoulder and a truck coming in opposite direction. One parked vehicle pulled onto the highway apparently not having seen the reporting driver approaching. The latter had misjudged other's intent and did not sound horn. He was able to brake just enough to let the truck by and pass the slow car without collision.

Example 4—Curve, Grade, Night, Drowsiness, Hurry

Reporting driver at 40 mph met car coming downhill on curve at night—other driver apparently drowsy, gradually veered into opposing lane—recovered enough to miss when reporting driver frantically blew horn and pulled right as far as possible. Other driver rated as "in a hurry."

Example 5—Night Visibility, Judgment of Speed, Hurry

Reporting driver halted at stop sign, night, no street light—car at left curb starting from parked position, did not perceive motion—looked to right and started slowly, braked hard as other driver "pushed through" in front of him.

DISCUSSION

Although probably not a representative cross section of all accidents in the country, the sample reported does give an indication of the range of causal combinations responsible for motor vehicle accidents. A research method is illustrated which could be used on a more extensive scale to obtain a more representative cross section.

One great advantage of the method is that it allows those reporting to indicate objectively factors which were of importance in causing the "near accident" event. The analyst, therefore, has a basis for eliminating a mass of irrelevant factors which are often included in large sample mass statistics. Such irrelevant factors may mask the actual causal combinations.

Factors favoring memory and recall of certain accidents rather than other may affect the incidents reported. For instance, dramatic happenings may tend to be recalled more often. Even so, certain factors which resulted are of significance and should be investigated further.

A larger than expected number of "hurry" ratings of "other" drivers and an unduly high proportion of certain types of misjudgment involving drivers "in a hurry" suggests very strongly that such a state of mind may be an important component of many accident causing constellations. Similarly the extremely high proportion of "pushing through" behavior is an important factor. It may be that this behavior was in many cases the indication upon which a rating of "hurry" was based.

It may be significant that "faulty driving habits" also occurred in the causal combinations with fairly high frequency.

Although we have pointed out certain groups of behavior characteristics which occurred most frequently in this particular group of reports, many additional components and combinations might be found in other samples of near accidents reported by another group or from other areas.

CONCLUSIONS

1. Although this study includes a relatively small and selected sample of "near accidents" its results can be of importance in indicating a wide range of possible causal combinations and in suggesting a method for further research.

2. A wide range of driver characteristics such as occupation, age, etc., were involved in the "near accident" incidents. Thus a wide range of types of "near accidents" and a wide range of ages of reporting drivers was included.

3. The sample of reporting drivers was definitely a selected one including clerical, professional and semi-professional people and many with a special knowledge and interest in traffic. This selection resulted from committee distribution of report forms to those interested and able to turn in reliable and meaningful reports. "Other drivers" in the "near accidents" however, should include a more random group of drivers.

4. The results suggest that certain types of driver judgments and behavior may be affected by "hurry" which may be of importance as one factor in accident causing factor combinations.

5. Behavior classed as "pushing through" was described in many incidents involving drivers rated as "in a hurry."

6. Only two of the accidents could be blamed upon a single causal factor alone and even these might include other factors. The remainder of the 177 involved from 2 to 7 categories of driving behavior and environmental conditions. A slight variation of any one of these might have changed the incident to an accident. Each of these classifications included from 6 to 12 sub-divisions of behavior or conditions, thus resulting in many thousands of possible combinations of factors in causal constellations.

7. This large number of causal combinations explains the general lack of success of

attempts to find a single cause for each traffic accident (which has been so widely used).

8. Much research is needed to analyze the widely different combinations of behavior and conditions which may get drivers into trouble. Scientifically valid information on such combinations of causal behavior and other factors which will forewarn drivers of hazards which they otherwise may not appreciate until suddenly met on the highway. It may also point out components of importance which can be affected by remedial engineering or enforcement approaches.

Appendix

To Those Cooperating in the Study:

It is well known that investigation of accidents can yield information as to their causes, but in some instances a person who has a near-accident may be more aware of what happened than drivers in an actual accident. This may be especially true with regard to behavior factors such as attention, vision, judgments and so on. Your cooperation is requested, therefore, in a preliminary study to see whether the reports of a selected group of drivers regarding near-accidents will yield useful information as to causal factors.

Most people have had at least a few occasions where they just missed being involved in a bad accident on the highway. Please recall, if possible, five or six of these with the most serious probable consequences.

Please fill in the blanks at the bottom of this sheet. Then describe briefly each near-accident on one of the blank forms attached, and mail in the self-addressed envelope. Sample description and 5 blank forms are enclosed for your use. All names will be kept confidential and any report of results will be anonymous.

Thanking you for your assistance, we remain

Sincerely yours,

Road User Characteristics Committee
of the Highway Research Board
T. W. Forbes, Chairman

Your Name _____ Age (Last Birthday) _____
Occupation _____ Total Driving Experience _____
City _____ State _____

SAMPLE

DESCRIPTION OF NEAR-ACCIDENT

Name x x x x x x x x x x x x
(confidential - for analysis only)

A. Please describe briefly what happened, including any important features of vehicle, highway, visibility and human factors which were involved.

Occurred on 4-lane, undivided highway in suburban area, clear, dry, good road, about 5:30 P. M. and getting rather dark. Peak hour traffic fairly heavy outbound (my direction). I was making left turn on green at signalized intersection across light opposing traffic. Thought I had plenty of time between two oncoming cars and started turn from my side of center line as required. Difficult to see intersection. Found I had turned a bit too soon and would hit center island of street I was entering—also discovered pedestrians crossing. Therefore I was forced to lengthen turn and slow down.

Oncoming car probably coming at about 50 mph (about average for this road), suddenly loomed up about to hit me broadside, blaring his horn but not slowing. I stepped on the accelerator and crowded the center island, he stepped on his brakes at last moment and skidded past my rear bumper just missing it.

B. In your opinion, what were the factors of most importance in producing this particular near-accident? (physical or human, or both)

Poor visibility of intersection and pedestrians; misjudgment of intersection location possibly from illusion due to angular overhead arrangement of two signals mounted on wire spanning highway at 45 degrees; glare from headlights and lack of intersection lighting; possible misjudgment of speed of oncoming car by me (but I don't think so); either hurry on part of other driver or conviction that he had complete right of way (since he used his horn rather than braking earlier).

C. Please check the following in relation to this particular near accident.

Remarks

1. Were you in a hurry at the time? Yes ☐ No ☒ _____
2. Was there evidence that other drivers involved were in a hurry? Yes ☒ No ☐ Evidence indirect
3. Was your attention—
Highly concentrated—on traffic? ☒ on something else? ☐ _____
Distracted by several things? ☐ _____
Neither? ☐ _____
Do not remember ☐ _____
4. Approximate time 1 months ago Fall P. M. twilight
years ago season A. M., P. M., Twilight,
night, day

DESCRIPTION OF NEAR-ACCIDENT

Name _____

(Confidential - For analysis only) _____

A. Please describe briefly what happened, including any important features of vehicle, highway, visibility and human factors which were involved.

B. In your opinion, what were the factors of most importance in producing this particular near-accident? (physical or human, or both)

C. Please check the following in relation to this particular near accident.

Remarks _____

1. Were you in a hurry at the time? Yes ☐ No ☐ _____

2. Was there evidence that other drivers involved were in a hurry? Yes ☐ No ☐ _____

3. Was your attention—
Highly concentrated—on traffic? ☐ on something else? ☐ _____

Distracted by several things? ☐ _____

Neither? ☐ _____

Do not remember ☐ _____

4. Approximate time _____ months ago _____ years ago _____ season _____ A. M., P. M., twilight, night, day

3. Report form blank.