

Critical Incidents in Behind-the-Wheel Instruction in Driver Education

JAMES L. Malfetti, Executive Officer, Safety Education Project, Teachers College, Columbia University, New York, N. Y.

Anderson, William G. Asst. Prof of Education, Teachers College.

• DRIVER EDUCATION, introduced into the high school 16 years ago, is now well established in the curriculum. It is offered at 12,600 of 17,227 public high schools, of which 10,869 give courses including behind-the-wheel instruction (1).

There have been steady improvements in course standards, in materials and techniques, and in teacher preparation and certification. However, most specialists as well as others interested in driver education recognize the need for further improvement and continual appraisal of programs, especially because of the demonstrated utility of driver education in reducing traffic accidents (2).

A significant part of instruction in driver education takes place "behind the wheel." Many factors suggest that this phase is highly important to future driving performance (3, 4). It is also unique: it makes a virtual "classroom on wheels." Part I* of this study is the first empirical attempt to analyze effective behind-the-wheel instruction.

STUDY PLAN

Techniques for identifying teacher effectiveness were reviewed in an effort to discover their applicability to behind-the-wheel instruction. The Critical Incident Technique was chosen because of its success in dealing with similar problems (5, 6, 7, 8); and because it was suited to identifying specific teacher behaviors that could later be used in the development of an evaluative instrument. In this technique, qualified observers describe specific incidents in which an individual performs effectively or ineffectively in terms of the stated aims of the activity. These incidents are then analyzed by abstracting the critically important behaviors in each description; the behaviors are inductively grouped to form categories. The category headings provide an outline of the critical aspects of the activity and ways in which individuals perform effectively and ineffectively in terms of these aspects. In this study, the technique provides a list of effective and ineffective teacher-behaviors in behind-the-wheel instruction.

This study also takes account of the situations in which the teacher-behaviors take place. In a critical incident, important conditions or events that precede or are concurrent with a critical behavior are called situational variables. These are abstracted from critical incidents in the same way critical behaviors are abstracted. The relationship between the variables and critical behaviors is then examined.

This identification of critical aspects of teaching, therefore, describes effective and ineffective teacher-behaviors as well as the conditions under which they took place.

COLLECTION OF DATA

Four groups were selected for the study because their close association with behind-the-wheel instruction put them in a position to judge its effectiveness:

*Part I of this two-part study describes effective and ineffective actions of teachers in behind-the-wheel instruction. Based on these actions, Part II will develop an instrument to measure effective teaching. Part II is scheduled for completion in April 1962. In its initial phases the study was financed by the AAA Foundation for Traffic Safety. It is now supported by the National Institutes of Health of the United States Public Health Service (RG-7365).

- Group I. High school teachers of driver education.
 Group II. College instructors of driver education.
 Group III. Supervisors or others responsible for evaluating driver education teachers.
 Group IV. High school students taking driver education.

In selecting persons from each group to contribute incidents, an attempt was made to choose a sample representative of driver education in high schools and colleges of the United States as a whole. The number of high school teachers chosen in each State was proportionate to the number of active driver education teachers in the State as compared with those active in the nation. Because of their relatively small numbers, all college teachers of driver education (on lists that could be obtained) were solicited. The total membership of the Supervisors Section of the National Safety Council was invited to contribute. Finally the high school students were selected from each of the six major geographical areas in the country (northeast, north-central, northwest, southeast, south-central, southwest).

All critical incidents were described in writing. Each person was asked to describe at least two incidents, one effective and one ineffective. A full page was made available for recording each incident. Different reporting forms were developed for each group. The following statements introduced the form used with high school teachers (appropriate changes were made for the other groups):

1. Think of the experiences you have had in the behind-the-wheel phase of your teaching in driver education during the past term. Describe an incident in which your behavior was especially effective in helping the student achieve the objectives of the driver education program. (Be sure to include just what you said or did and how it affected the student. Please do not give a general description—try to limit your response to a specific incident.)

2. During the past term there may have been some incidents in the behind-the-wheel phase of the program in which you said or did something which seemed to be detrimental to your student's progress. Describe your behavior in one of these incidents and the effect it had on the student. (Or describe an incident you have observed in which another teacher said or did something which was detrimental to a student's progress.)

Incidents from teachers and supervisors were collected by mail. Students had to be carefully oriented to the purposes of the study before they were able to contribute usable incidents, so a group-interview technique was developed and used. The respondents were assured that the incidents they described would be used only for research purposes, not for personal evaluations.

In keeping with the requirements of the Critical Incident Technique, criteria for accepting incidents were established. Most important among these were the following: (a) the incident must describe an actual happening observed by the reporter; (b) it must

TABLE 1
DISTRIBUTION OF RESPONSES

Group	Mailings	Usable Responses	Effective		Behavior per Incident	Ineffective		Behavior per Incident	Total		Behavior per Incident
			Incidents	Behaviors		Incidents	Behaviors		Incidents	Behaviors	
High school teachers	2,599	516	557	742	1.33	374	388	1.04	931	1,130	1.21
College instructors	282	62	70	105	1.50	59	61	1.03	129	166	1.29
High school students	(68) ¹	775	574	638	1.11	488	488	1.00	1,062	1,126	1.06
Total	2,881	1,353	1,201	1,485	1.24	921	937	1.02	2,122	2,422	1.14

¹Group interviews.

TABLE 2
SCALE OF AGREEMENT—DISAGREEMENT IN ABSTRACTING
CRITICAL BEHAVIORS

Agreement:

- A₁ Judge identifies the same behavior identified by the investigator. (He may identify the same words or the same ideas. When both the judge and the investigator underline the behavior, agreement depends on whether they underline essentially the same words. When one or both summarize a behavior, agreement must necessarily depend on the similarity of ideas.)
- A₂ Judge identifies as two or more behaviors, material that investigator identifies as one.
- A₃ Judge identifies as one behavior, material that the investigator has divided into two or more.

(A₂ and A₃ are considered areas of agreement because in each case essentially the same material was identified. The fact that a judge separates a single behavior into two parts, or vice versa, does not seem to constitute a significant disagreement.)

Agreement-Disagreement:

- A-D Judge identifies essentially the same behavior but adds an idea not identified by the investigator, or judge identifies essentially the same behavior but omits an idea identified by the investigator.

(A-D is an area of partial agreement and partial disagreement relating to the identification of a single behavior.)

Disagreement:

- D Judge omits the behavior identified by the investigator or identifies another behavior in its place, or judge identifies a behavior not identified by the investigator.

(In accordance with these criteria of disagreement, when a judge and an investigator each identifies one behavior in a given incident and these behaviors are completely different, this constitutes one instance of disagreement.)

Because the category of agreement-disagreement constituted an area of partial agreement, the following formulas were used to determine total agreement and total disagreement:

$$\text{Total agreement} = A_1 + A_2 + A_3 + \frac{A-D}{2}$$

$$\text{Total disagreement} = D + \frac{A-D}{2}$$

take place in behind-the-wheel instruction; (c) it must include a clear description of teacher behavior.

In tabulating responses (Table 1), of the 2,599 high school instructors who were mailed critical incident forms, 516 (19.1 percent) contributed usable incidents. Ninety more returned incidents that proved unusable, and 133 explained why they could not comply. A total of 62 college instructors (out of 282 who were sent forms) contributed usable incidents (21.7 percent) and 775 high school students contributed incidents describing the behavior of at least 68 teachers in 68 different schools. (The exact number

of teachers is not known because some classes from which student incidents were collected had more than one teacher instructing behind the wheel.) No more than 20 incidents describing the behavior of one teacher (10 effective and 10 ineffective) were accepted.

Only 29 of 626 supervisors returned usable responses. Among the most frequent reasons for supervisors' being unable to comply was "I have not recently had an opportunity to observe behind-the-wheel instruction." Because of the inadequate return, responses from the supervisors' group were not used.

ANALYSIS OF DATA

The first step in analysis was abstracting critical behaviors. Each behavior was identified by underlining the part of the incident that described the action of the teacher judged to be especially effective or ineffective. Some incidents contained more than one critical behavior. Each behavior was coded and recorded. A total of 2,422 critical behaviors was abstracted from the 2,122 incidents used in the study (1.14 critical behaviors per incident) (see Table 1).

A group of 50 incidents (25 effective and 25 ineffective) was selected at random. A member of the study team underlined or summarized the critical teacher-behaviors in each incident. Two judges, competent to use the Critical Incident Technique, were asked to underline or summarize critical behaviors from the same 50 incidents. A scale of agreement-disagreement was developed (see Table 2) and the abstractions of the judges compared with those of the study team. Judge 1 and the study team agreed on 77.8 percent of the critical behaviors abstracted; Judge 2 and the study team agreed on 73.7 percent.

Critical behaviors were inductively grouped into categories. Category headings were devised to describe all behaviors in the category. As the number of behaviors in each category increased, subcategories were developed to account for the different types. Finally, categories and subcategories were grouped under four major areas of behavior.

Originally, critical behaviors contributed by teachers and students were classified separately. On examination, however, the separate classifications proved to be similar, and they were combined although the number of critical behaviors contributed by each group was tabulated separately (see Table 3).

Table 3 lists the 93 critical teacher-behaviors identified by this study. Each behavior is actually a summary statement describing similar behaviors within a subcategory. The behaviors are grouped into 20 categories and the categories are organized under four major areas of behavior. The list describes effective and ineffective behind-the-wheel instruction in terms of the critical behaviors identified in the study.

ANALYSIS OF FINDINGS IN TABLE 3

The number of abstracted critical behaviors contained in areas of behavior, categories and subcategories are given in Table 3. More effective behaviors (1,485) were described than ineffective (937). This may represent a reluctance on the part of students and teachers to report ineffective behaviors. In areas of behavior, 49.80 percent occur in Area I (Control), 30.55 percent in Area III (Analysis), 13.01 percent in Area IV (Special Technique), and 5.12 percent in Area II (Example).

The number of abstracted critical behaviors in each subcategory evidences wide variation. Certain subcategories stand out as frequently mentioned types of critical behavior:

1. Effective analysis of student's bad driving actions (freq. 381) and ineffective analysis of student's bad driving actions (freq. 177) are the two largest. This is due partly to their broadness (each has 6 component behaviors), but it also indicates the importance of the teacher's reaction to student mistakes. Perhaps the student is most educable the moment he makes a mistake.
2. Another frequently mentioned behavior is the teacher's use of the dual-control brake. Effective use to avoid an accident (freq. 111) occurred less frequently than ineffective use in nondangerous situations (freq. 121). This suggests that although the dual-control brake may protect those in the car, its overuse often results in poor instruction.

TABLE 3

**EFFECTIVE AND INEFFECTIVE BEHAVIORS OF DRIVER EDUCATION TEACHERS
IN BEHIND-THE-WHEEL INSTRUCTION^{1,2}**

Area of Behavior: **1. TEACHER CONTROLS STUDENT DRIVING (T 579 - S 628)**

Category: **1. Teacher takes control of vehicle from student driver
(T 122 - S 249)**

Effective Behaviors

- a - Applies dual-control brake and/or turns steering wheel to avoid accident (T 59 - S 52)
- b - Applies dual-control brake when necessary to stop vehicle (in its immediate position) to point out student's mistake (T 14 - S 2)
- c - Takes partial control of vehicle when student needs assistance in performing maneuver or skill (T 21 - S 0)
- d - Applies dual-control brake to keep student from committing serious violation (T 0 - S 23)

Ineffective Behaviors

- a - Applies dual-control brake and/or turns steering wheel before any real danger arises and before student has chance to make necessary corrections himself (T 6 - S 115)
- b - Jams on dual-control brake (when student makes mistake) in a way that unreasonably magnifies student's mistake (T 7 - S 9)
- c - Continually assists student by taking partial control of vehicle without allowing student to perform maneuver or skill by himself (T 15 - S 48)

Category: **2. Teacher allows student to maintain control of vehicle
(does not take control of vehicle) (T 32 - S 10)**

- a - Allows student to make driving error to help him learn through mistake (T 22 - S 7)
- b - Does not take control of vehicle when time and circumstances permit student to correct his own mistake (T 4 - S 3)

- a - Allows student to make dangerous mistake (and/or get into accident) (T 6 - S 0)

Category: **3. Teacher directs student control of vehicle before student starts to drive (T 34 - S 36)**

- a - Tells student exactly where to drive vehicle (what route to take) (T 3 - S 3)

- a - Gives vague directions in telling student where to drive (T 2 - S 1)

¹For clarity of organization, the list is divided into "Areas of Behavior" and "Categories." Critical behaviors are listed under categories and are actually summary statements describing groups of similar behaviors. Generally, ineffective behaviors are placed opposite their effective counterparts.

²T = number of teacher-described critical behaviors in area of behavior, category, or subcategory. S = number of student-described critical behaviors in area of behavior, category, or subcategory.

Effective Behaviors	Ineffective Behaviors
<p>b - Gives clear and precise description of what actions student should take in performance of driving skill or maneuver (T 10 - S 5)</p>	<p>b - Gives vague and/or incomplete description of what actions student is to take in performance of a skill or maneuver (T 5 - S 8)</p> <p>c - Fails to point out what actions need be taken in performance of maneuver or skill (T 8 - S 10)</p> <p>d - Incorrectly points out what actions to take in performance of skill or maneuver (T 6 - S 9)</p>

Category: 4. Teacher directs student control of vehicle while student is driving (T 292 - S 310)

<p>a - Gives clear and precise description of what actions to take in performance of maneuver or skill (talks student through maneuver) (T 60 - S 54)</p> <p>b - Reminds student what actions need be taken in performance of maneuver or skill (T 11 - S 89)</p> <p>c - Effectively directs student performance of maneuvers or skills (which student already capable of performing) by doing one or more of following (T 30 - S 32)</p> <p>c₁ - Clearly indicates which maneuver or skill student is to perform</p> <p>c₂ - Chooses correct moment to tell student when to perform maneuver or skill</p> <p>c₃ - Has student perform in driving situation that helps (or allows) student master specific skills and maneuvers</p> <p>d - Tells student what actions to take to cope successfully with impending driving situation (T 33 - S 22)</p> <p>e - Purposely does not direct student driving when student capabilities and driving conditions permit student to direct his own driving (T 10 - S 2)</p>	<p>a - Gives vague or confusing description of what actions student should take in performing maneuver or skill (T 7 - S 10)</p> <p>b - Constantly emphasizes some actions that need be taken and neglects others (T 8 - S 2)</p> <p>c - Ineffectively directs student performance of maneuvers or skills (which student is already capable of performing) by doing one or more of the following (T 42 - S 43)</p> <p>c₁ - Gives vague and/or confusing directions as to which maneuver or skill student is to perform</p> <p>c₂ - Tells student to perform maneuver or skill either too early or too late</p> <p>c₃ - Tells student to perform maneuver or skill not correct in terms of driving situation</p> <p>d - Fails to tell student what actions to take to cope with impending driving situation (T 4 - S 2)</p> <p>e - Continuously gives directions when not necessary (T 16 - S 23)</p> <p>f - Has student perform in driving situation in which he is not capable of performing (T 16 - S 3)</p> <p>g - Tells student to perform maneuver or skill he is not capable of performing (T 17 - S 10)</p>
--	---

Effective Behaviors

Ineffective Behaviors

Effective Behaviors	Ineffective Behaviors
	<ul style="list-style-type: none"> h - Yells directions at student (T 22 - S 3) i - Continuously repeats same (unsuccessful or unnecessary) directions (T 10 - S 2) j - Directs student to perform incorrect or unsafe driving maneuvers (T 6 - S 13)

Category 5. Teacher determines when student shall drive (T 74 - S 20)

<ul style="list-style-type: none"> a - Has student stop car (temporarily) when necessary to have student pay full attention to teacher's explanation (T 11 - S 15) b - Has student stop car (temporarily) when necessary to provide student with needed rest (T 7 - S 0) c - Allows student to resume driving after harrowing or discouraging experience to help student regain confidence in his driving (T 25 - S 2) d - Discontinues student's driving lesson for remainder of period when student's driving endangers safety of those in driver education car (T 11 - S 2) 	<ul style="list-style-type: none"> c - Allows student to continue driving when he is not emotionally or physically capable of driving (T 5 - S 1) d - Punishes student for his mistake by discontinuing student's driving lesson for remainder of period (T 15 - S 0)
--	---

Related Sub-Area of Behavior: I₁. TEACHER HELPS STUDENT TO UNDERSTAND REASONS FOR TEACHER'S CONTROL OF STUDENT DRIVING (T 25 - S 3)

Category 6.

<ul style="list-style-type: none"> a - Explains why he assumed control of vehicle (T 2 - S 1) b - Explains why he gave student certain directions at particular time (T 10 - S 2) c - Explains reasons for discontinuing student's driving lesson (T 3 - S 0) d - Explains his function as it relates to control of student driving (T 8 - S 0) 	<ul style="list-style-type: none"> a - Fails to explain reasons for using dual-control brake (T 1 - S 0) d - Fails to explain his function as person responsible for controlling student driving (T 1 - S 0)
---	--

Area of Behavior: II. TEACHER SETS EXAMPLE FOR STUDENTS TO FOLLOW (T 78 - S 46)

1. Teacher sets example as driver (T 46 - S 37)

Effective Behaviors	Ineffective Behaviors
a - Expertly demonstrates driving skills (T 29 - S 32)	a - Fails to demonstrate driving maneuver or skill (T 1 - S 1)
b - Demonstrates lawful and courteous driving behavior (T 3 - S 0)	b - Violates law (or rules of safe driving) in his demonstration (T 13 - S 4)

2. Teacher sets an example for students (during behind-the-wheel instruction) when he is not driving (T 24 - S 8)

a - Behaves in safe, courteous, and calm manner when not driving (T 12 - S 0)	a - Behaves in unsafe, nervous, or impatient manner when not driving (T 12 - S 8)
---	---

Related Sub-Area: II₁. TEACHER ANALYZES OWN DRIVING BEHAVIOR (T 8 - S 1)

a - Explains reasons for his own driving actions (T 6 - S 1)	b - Refuses to admit his mistakes (T 2 - S 0)
--	---

Area of Behavior: III. TEACHER IMPLEMENTS STUDENT'S KNOWLEDGE OF DRIVING TASK THROUGH VERBAL ANALYSIS, EXPLANATION, AND DISCUSSION (T 406 - S 334)

Category 1. Teacher analyzes student's driving actions (T 311 - S 303)

a - Effectively analyzes student's good driving actions by doing one or more of following (T 17 - S 3)	a - Fails to analyze student's good driving actions by doing one or more of following (T 3 - S 1)
a ₁ - Identifies student actions that represent good driving	a ₁ - Fails to identify student actions that represent good driving
a ₂ - Explains why student actions represent good driving	a ₃ - Fails to commend student for his good driving
a ₃ - Commends student for his good driving	b - Ineffectively analyzes student's bad driving actions by doing one or more of following (T 102 - S 75)
b - Effectively analyzes student's bad driving actions by doing one or more of following (T 170 - S 211)	b ₁ - Continually identifies all student actions that represent bad driving
b ₁ - Identifies student actions that represent bad driving	b ₂ - Sarcastically points out student actions that represent bad driving.
b ₂ - Identifies cause of student's bad driving	

Effective Behaviors

- b₃ - Explains why student actions represent bad driving
- b₄ - Explains importance of student's bad driving actions
- b₅ - Explains what student should do to correct or improve his driving

Ineffective Behaviors

- b₃ - Harshly reprimands or criticizes student for his bad driving
- b₄ - Threatens to fail student or to punish him in some other way for his bad driving
- b₅ - Laughs at or makes joke of student's bad driving
- b₆ - Overemphasizes dangers that may result from student's bad driving
- c - Fails to analyze student's bad driving by doing one or more of following (T 19 - S 13)
 - c₁ - Fails to identify student actions that represent bad driving
 - c₂ - Fails to discover cause of student's bad driving
 - c₃ - Simply berates student without identifying or correcting his bad driving.

Category 2. Teacher allows student to analyze his own driving actions (T 31 - S 16)

- a - Provides student driver with opportunity to identify, and make suggestions for correcting his own mistakes (T 21 - S 10)
- b - Does not identify student's mistake when (a) obvious that the student is aware of the mistake and (b) the student makes so many mistakes it would be confusing and discouraging to identify all of them (T 10 - S 6)

Category 3. Teacher analyzes actions of other drivers (T 11 - S 5)

- a - Analyzes bad driving actions of other drivers by doing one or more of the following (T 11 - S 5):
 - a₁ - Identifies actions of other drivers that represent bad driving
 - a₂ - Explains why actions represent bad driving
 - a₃ - Points out significance of actions for student driver

Category 4. Teacher assesses student's capabilities and accomplishments as driver (T 39 - S 5)

- a - Assures student he is capable of performing maneuver or of becoming good driver (T 17 - S 3)
- a - Tells student he will have difficult time learning to drive (T 5 - S 1)

Effective Behaviors

Ineffective Behaviors

Effective Behaviors	Ineffective Behaviors
	b - Tells student he will never learn to drive or not be good driver (T 14 - S 1) c - Compliments student too much for his performance and/or does not give realistic appraisal of student's performance (T 3 - S 0)

Category 5. Teacher orients student to driving task (T 12 - S 5)

- | | |
|---|--|
| a - Points out important elements in driving task and what student must do to cope with them (T 14 - S 5) | |
|---|--|

Area of Behavior: IV. TEACHER USES SPECIAL INSTRUCTIONAL TECHNIQUES (T 209 - S 106)

Category 1. Teacher uses special instructional techniques to implement his control of student driving (T 61 - S 29)

a - Has student repeat his directions to make sure student understands and follows them (T 7 - S 24) b - Has student point in direction he is going to turn when student has shown prior inability to distinguish between right and left (T 4 - S 0) c - Uses variety of special techniques to enable (slow) student to follow directions more easily (T 12 - S 0) d - Uses special methods to bring violations to attention of students who disobey law (T 9 - S 0) e - Helps nervous student to relax through patient explanation, direction, conversation, or simply by not saying anything (T 24 - S 5)	a - Uses variety of special techniques for controlling student's driving that prove disadvantage to student (T 5 - S 0)
---	---

Category 2. Teacher uses special instructional techniques to implement his analysis of student's driving actions, other drivers' actions, and elements in driving situation (T 35 - S 9)

- | | |
|--|--|
| a - Uses skill tests to make student aware of his true driving abilities (T 12 - S 0)
b - Uses charts and demonstrations to clarify his explanation (T 8 - S 6) | |
|--|--|

Effective Behaviors	Ineffective Behaviors
<p>c - Has student get out of car and view driving situation from different or better perspective (T 8 - S 3)</p> <p>d - Has driving group discuss and analyze student's driving actions or actions of other drivers (T 7 - S 0)</p>	
<p>Category 3. Teacher uses special instructional techniques to help student master skills (T 55 - S 0)</p>	
<p>a - Has student repeat same maneuver or skill one or more times until student corrects his mistake or masters skill (T 21 - S 0)</p> <p>b - Has student perform certain (driving) drills to help him master skill or maneuver (T 24 - S 0)</p> <p>c - Brakes down driving skill into its components to enable student to master it (T 2 - S 0)</p> <p>d - Helps student learn to anticipate driving hazards by asking him questions about driving situation he is about to meet (T 6 - S 0)</p>	<p>b - Uses drills that inadequately prepare student for real driving situation (T 3 - S 0)</p>
<p>Category 4. Teacher uses special instructional techniques in exercising control over composition and behavior of driving group (T 23 - S 3)</p>	
<p>a - Changes student from one driving group to another (when first group presents impediment to student's progress) (T 4 - S 0)</p> <p>b - Conducts driving lesson with one student in car when presence of other students interferes with student driver's progress (T 2 - S 0)</p> <p>c - Establishes and explains reasons for class procedures (T 8 - S 0)</p>	<p>a - Places student in driving group that impedes student's driving progress (T 6 - S 0)</p> <p>b - Fails to control behavior of driving group (T 3 - S 3)</p>
<p>Category 5. Teacher includes special maneuvers, skills, and tasks in behind-the-wheel program (T 20 - S 8)</p>	
<p>a - Includes special maneuvers in instruction (such as emergency stop and simulated hazardous conditions) to prepare student better for variety of driving situations he will meet (T 8 - S 0)</p>	<p>a - Unduly restricts variety of maneuvers and skills student performs during course (T 1 - S 8)</p>

Effective Behaviors	Ineffective Behaviors
b - Has student act responsibly and courteously in performing tasks related to driving (T 11 - S 0)	
Category 6. Miscellaneous (T 15 - S 57)	
e - Miscellaneous (T 7 - S 8)	a - Punishes student by actually hitting him (T 2 - S 3) b - Distracts student while he is driving by talking about things unrelated to immediate driving task (T 9 - S 39) c - Ineffectively organizes driving instruction (i. e. , driving time, presentation of new materials, etc.) (T 4 - S 7) d - Insists that student use method of performing skill not suited to student (T 0 - S 8) e - Miscellaneous (T 17 - S 4)

3. Precise descriptions of what actions to take in a maneuver or skill (freq. 114) are valuable to effective instruction. They increase the efficiency of instruction by reducing the number of errors, which result from inadequate student understanding of what is expected. In this respect, effective descriptions serve much the same purpose as effective demonstrations.

4. Often effective instruction involves a simple comment that reminds students what actions need to be taken in performing a maneuver (freq. 100). These simple comments (like "check mirror") may need to be repeated frequently to a student—especially when he tends to forget.

Effective subcategories with high frequencies are usually paralleled by, or represent the counterpart of high frequency ineffective subcategories. Thus certain "types" of behaviors (like stepping on the brake) are particularly crucial because they often represent ineffective instruction as well as effective instruction—good and bad teaching involve the same types of behaviors, but they do so at different times, under different circumstances, and in different ways.

Although both students and teachers are considered qualified reporters, the differences and similarities in their descriptions of critical incidents are interesting. Comparisons are based on frequency distributions of abstracted critical behaviors within areas of behavior, categories and subcategories.

Because of the way incidents were selected for the study, student-described and teacher-described behaviors cannot be directly compared on the basis of effective-ineffective distribution. All teacher-described incidents were used. Student-described incidents were randomly selected from each class reporting—up to 10 effective and 10 ineffective incidents per class. Thus, student-described incidents would reflect a more equal effective-ineffective distribution. However, the distribution of teacher-described and student-described behaviors within areas of behavior, categories, and subcategories can be compared by relating the percentage of all teacher-described effective or ineffective behaviors contained in a given category to the percentage of all student-described effective or ineffective behaviors contained in the same category.

Distributions of student-described and teacher-described behaviors within areas of behavior are generally similar, as shown in Table 4. For both groups Area I contains

TABLE 4
 FREQUENCY DISTRIBUTION OF TEACHER-DESCRIBED AND STUDENT-DESCRIBED
 CRITICAL BEHAVIORS WITHIN AREAS OF BEHAVIOR

Area of Behavior	Effective Behavior				Ineffective Behavior				Total Behaviors			
	Teacher-Described		Student-Described		Teacher-Described		Student-Described		Teacher-Described		Student-Described	
	Freq.	Per-cent	Freq	Per-cent	Freq	Per-cent	Freq	Per-cent	Freq	Per-cent	Freq.	Per-cent
I (Control)	354	41.79	316	49.53	225	50.11	312	63.94	579	44.68	628	55.77
II (Example)	50	5.90	33	5.17	28	6.24	13	2.66	78	6.02	46	4.08
III (Analysis)	260	30.70	243	38.09	146	32.52	91	18.65	406	31.33	334	29.67
IV (Special Technique)	176	20.78	38	5.96	33	7.35	68	13.93	209	16.13	106	9.41
Unclassifiable	7	0.83	8	1.25	17	3.79	4	0.82	24	1.85	12	1.07
Total	847	100	638	100	449	100	488	100	1,296	100	1,126	100

most behaviors, Area III is next, and Area IV and Area II follow in that order. Also, this similarity in relative frequencies within areas of behavior is true for effective as well as ineffective behaviors. Apart from this general agreement, however, there are some differences.

Of all effective teacher-described behaviors, 20.78 percent relate to special instructional techniques (Area IV), whereas only 5.96 percent of effective student-described behaviors are in this area. This may reveal the inability of students to recognize special educational techniques. On the other hand, it may also indicate that the relative effectiveness of special techniques is overemphasized by teachers, perhaps at the expense of the more fundamental actions (such as control and analysis) which seem to be critically important more often than teachers realize.

Students, more than teachers, describe ineffective behaviors relating to control (see Table 4). Apparently students are keenly aware of the need to assume responsibility for their own driving and tend to resent interference by teachers. Many teachers should recognize this need and permit students more control over the car when circumstances permit—certainly the objective of driver education must be to allow students gradually to drive on their own. In fairness to teachers, however, it should be admitted that students may overestimate their ability to deal with difficult driving situations. Thus the need for teacher control may be justified more often than students realize.

The distribution of student-described and teacher-described behaviors into subcategories shows a great deal of similarity. Student-described behaviors, however, tend to be more concentrated in certain subcategories, whereas teacher-described behaviors are more evenly distributed (see Table 3). In fact, 29 subcategories have no student-described behaviors, whereas only 2 subcategories contain no teacher-described behaviors. (It should be mentioned, however, that subcategories containing no student-described behaviors usually contain a small number of teacher-described behaviors.) Again, this is probably the result of some limitations in students. It may be difficult for them to recognize and describe in writing the subtleties of teacher-actions.

ANALYSIS OF SITUATIONAL VARIABLES

Situational variables are conditions or events described in a critical incident that precede or are concurrent with a critical behavior. They represent the teaching situation in which a critical behavior takes place. They do not include (a) teacher-behaviors or (b) events or conditions occurring after the critical behavior.

In all areas of education, effective teaching involves flexibility. The good teacher uses methods and techniques appropriate for the teaching situation. Differences in student-capabilities, subject matter, classroom settings, etc., require variation in approaches.

This kind of flexibility is required of the driver education teacher as well, particularly in behind-the-wheel instruction. The same technique or behavior is not always suitable everywhere. It can be good or bad, depending on the situation. For example, the teacher who uses his dual control brake when the student has lost control is performing effectively. But if he uses it when the student has control, he may be performing ineffectively.

The purpose of this analysis of situational variables is to describe critical behaviors more meaningfully by specifying the situations in which they occur.

Abstracting and Classifying Situational Variables

While critical behaviors were being abstracted from incidents, situational variables relating to each behavior were also abstracted and recorded on the same index card.

A total of 130 different types of variables was identified and inductively grouped to form 21 categories. These represented the 21 key situational variables most important to effective teaching. They were grouped into five relatively independent categories so that for a given critical behavior a maximum of one situational variable was abstracted from each of the five categories (see Table 5).

TABLE 5
IMPORTANT SITUATIONAL VARIABLES DESCRIBED IN CRITICAL INCIDENTS

Category	Fre- quency	Per- cent
Category I. MANEUVERS, SKILLS, AND OTHER DRIVING ACTIONS BEING PERFORMED AND/OR TAUGHT		
1. Basic skills: starting engine, shifting gears, using clutch, accelerating, decelerating, braking, steering	417	20.0
2. Basic maneuvers (involving a series of skills): driving forward, staying on roadway in proper lane, stopping, backing, turning right and left, turning around, parking, changing lanes, passing	688	33.1
3. Safety precautions used in performance of skills and maneuvers: signaling, checking mirrors, checking for cars and other possible hazards, checking car before driving	150	7.2
4. Driving in accordance with traffic, road, and weather conditions: observing traffic signs and signals, responding to movement of other vehicles, maintaining proper speed for road and traffic conditions, responding to hazards, etc.	789	37.9
5. Courteous driving: actions that show consideration for other drivers and pedestrians	36	1.7
Total	2,080	100
Category II. STUDENT DRIVERS' PERFORMANCE OF SKILLS, MANEUVERS, AND OTHER DRIVING ACTIONS¹		
1. Student performs (skill, maneuver, etc.) correctly	88	5.3

Category	Fre- quency	Per- cent
2. Student performs (skill, maneuver, etc.) incorrectly, or fails to perform it when necessary	811	49.3
3. Student never performed (skill, maneuver, etc.) before	171	10.4
4. Student previously performed (skill, maneuver, etc.) correctly	6	0.4
5. Student repeatedly performs (skill, maneuver, etc.) incorrectly or repeatedly fails to perform it when necessary	<u>569</u>	<u>34.6</u>
Total	1,645	100
Category III. DRIVING ENVIRONMENT		
1. Practice driving area: not on public streets, enclosed areas, or no traffic area	27	6.3
2. Difficult or hazardous traffic conditions: heavy traffic, pedestrians in roadway, movement of other cars presenting obstacles to movement of driver education car, dangerous actions of other drivers, etc.	322	75.4
3. Difficult or hazardous road and weather conditions: ice, snow, rain, narrow and unpaved roads, etc.	<u>78</u>	<u>18.3</u>
Total	427	100
Category IV. CHARACTERISTICS OF STUDENT DRIVER		
1. Unfavorable temperament for driving or learning to drive: nervous, frightened, excited, emotionally upset, etc.	231	43.8
2. Unfavorable attitude for driving or learning to drive: reckless, overconfident, no confidence, over cautious, know-it-all, reluctant to learn, etc.	99	18.9
3. Not competent for driving or learning to drive: uncoordinated, slow learner, poor vision, etc.	56	10.6
4. Inattentive	32	6.1
5. Inexperienced driver under present conditions	67	12.7
6. Experienced or competent driver	<u>42</u>	<u>8.0</u>
Total	527	100
Category V. POSSIBLE ACCIDENT INVOLVEMENT		
1. Driver education car not in danger of being involved in accident	35	10.2
2. Driver education car about to be involved in accident	<u>308</u>	<u>89.8</u>
Total	343	100
Total	5,022	

¹Listed under category I.

Table 5 gives the number of times situational variables were mentioned in connection with all critical behaviors. A total of 5,022 situational variables was abstracted in connection with 2,422 critical behaviors. Variables in categories I and II (maneuver being performed, and student-drivers' performance) are mentioned most frequently. Among individual variables, students' incorrect performance (II-2) and driving in accordance with traffic conditions (I-4) have the highest frequencies. Furthermore, variables II-2 and II-5 (both relating to student errors) have a combined frequency of 1,380, which means that one or the other is mentioned in connection with more than one-half of all abstracted critical behaviors. Apparently behind-the-wheel instruction, effective and ineffective, is largely a matter of teacher reactions to student errors of commission or omission.

Relationship Between Situational Variables and Critical Behaviors

The number of times each situational variable was mentioned in connection with a category of critical behavior was tabulated*. An examination of these variables, present when each type of critical behavior took place, provided an excellent indication of the part played by the teaching situation in determining effective or ineffective behavior.

Statistical Analysis.—The χ^2 test was used to discover whether observed distributions of situational variables within categories of critical behavior were significantly different from expected distributions.

The frequency of mention for each specific variable accounted for a proportion of the total frequency of variables within a category of variables (see Table 5). These proportions were used to determine expected frequencies for each variable. For example, the specific variable, "student performs maneuver or skill incorrectly" is mentioned 811 times, and accounts for 49.3 percent of all variables relating to the student-driver's performance (Category II). Thus, when the performance is mentioned, "student performs maneuver or skill incorrectly" might be expected to account for 49.3 percent of the variables.

Expected frequencies for certain situational variables were especially low and did not permit adequate statistical analysis. To overcome this problem, similar variables with low frequencies were combined to form variables called "other" *.

Results.—Application of the χ^2 test to differences between observed and expected frequencies resulted in the identification of 28 groups of situational variables with frequencies significantly different from those expected at the 0.05 level or below*.

A summary follows of the significant relationships between critical behaviors and situational variables:

1. Taking control of the car from the student driver is more likely to be effective when the student (a) is performing complex maneuvers in traffic, (b) makes an error, and (c) comes close to an accident. The same action can be ineffective when the student is performing basic skills under normal driving conditions. Thus a difficult driving situation requires increased teacher control—especially when the student cannot handle it. On the other hand, too much teacher control may occur in the initial stages, when students are learning basic skills under relatively safe conditions.

Allowing the student to maintain control even when he makes a serious error, is frequently effective, provided an accident situation is not created.

2. Teacher demonstrations are effective, particularly when they relate to basic driving skills and when the student has performed incorrectly time after time. Only a small proportion of effective demonstrations relate to the more difficult task of driving in accordance with traffic and road conditions. Perhaps driving safely in traffic is something that is best learned through personal experience.

3. Analysis and explanation of student-driving is more often effective when it relates to (a) complex driving tasks performed in traffic, (b) incorrect student-performance, and (c) dangerous situations. Faulty analysis usually takes place when basic skills and maneuvers are being taught. Choosing proper occasions to explain student mistakes seems to be largely a matter of common sense. Complex or dangerous situations

*Table available from author on request.

represent teachable moments during which students are receptive to explanations. On the other hand, students seem to resent unnecessary explanations relating to elementary mistakes when a simple reminder would suffice.

4. Special techniques are appropriate for instruction in basic skills and maneuvers when students repeatedly make mistakes. Such techniques are particularly valuable when ordinary methods fail.

VALUE OF FINDINGS

The critical behaviors identified in this study should prove valuable to the improvement of driver education in a number of ways:

1. They provide criteria for the development of a measuring instrument to be used in evaluating the effectiveness of driver education teachers. (Part II of this study will develop such an instrument.)

2. College teachers of driver education can use the findings to develop curriculum content in teacher preparation courses.

3. Driver education teachers will find the list of behaviors useful as guides for their own instruction.

4. The findings have many significant implications for other areas of education concerned with the teaching of performance skills.

SUMMARY

Representative samples of high school teachers, college instructors, and high school students of driver education contributed 2,122 critical incidents which described effective and ineffective behaviors of driver education teachers in behind-the-wheel instruction. A total of 2,422 critical teacher behaviors was abstracted from the incidents.

Abstracted behaviors were inductively grouped to form 20 categories and 92 subcategories. Similar categories were grouped under four major Areas of Behavior: Area I—Teacher Controls Student Driving; Area II—Teacher Sets an Example for Students to Follow; Area III—Teacher Implements Student's Knowledge of the Driving Task through Verbal Analysis, Explanation, and Discussion; Area IV—Teacher Uses Special Instructional Techniques. Summary statements, describing behaviors in each subcategory, represent the critically effective and ineffective teacher-behaviors identified in this study.

Frequency distributions of abstracted critical behaviors within areas of behavior, categories, and subcategories, were tabulated. In terms of the system of classification developed from the material, Area I (Control) contained the most critical behaviors (1,207) and stands out as an educational technique uniquely important to effective instruction. In addition, the frequency distributions of teacher-described and student-described behaviors were compared. Generally, students and teachers agreed in their descriptions, but the latter covered a wider range of behaviors.

Situational variables (or important elements in the teaching situation) present when specific critical behaviors took place were also abstracted and categorized. Significant relationships between critical behaviors and situational variables were identified. The results suggest that critical behaviors vary in their effectiveness according to the situation in which they occur.

In Part II of this study, important critical behaviors and situational variables will be used to construct an instrument to measure teacher effectiveness. It will probably consist of a behavioral checklist and will need to be administered by a trained observer. Hopefully it will aid in the supervision and improvement of behind-the-wheel instruction.

REFERENCES

1. "Report on Twelfth Annual National High School Driver Education Award Program." Association of Casualty and Surety Companies, New York (1959).
2. "Driver Education Reduces Accidents and Violations." American Automobile Association, Washington, D. C. (Jan. 1959).
3. "Driver Education: A Syllabus for Secondary Schools." Bureau of Secondary Curriculum Development, State Education Dept., Albany (1957).

4. "Handbook of Human Engineering." Institute for Applied Experimental Psychology, Tufts College, Special Devices Center, Pt. 9, Ch. 4, Sec. 1, Par. 1-2 (1952).
5. Preston, H. O., "The Development of a Procedure for Evaluating Officers in the United States Air Force." American Institute for Research, Pittsburgh (1948).
6. Jensen, A. C., "Determining Critical Requirements for Teachers." Jour. Exp. Educ., 20:79-86 (Sept. 1951)
7. Smit, J:A., "A Study of Critical Requirements for Instructors of General Psychology." Univ. of Pittsburgh Bull. 48, 279-284 (1952).
8. Stewart, L. H., "A Study of Critical Training Requirements for Teaching Success." Jour. Educ. Res., 49:651-652 (May 1956).
9. Flanagan, J. C., "The Critical Incident Technique." Psychol. Bull., 54, 4 (July 1954).
10. Long, B. M., "A Synthesis of Recent Research Studies on Predicting Teacher Efficiency." Catholic Educ. Rev., 4:217-230 (April 1957).
11. "Policies and Practices for Driver Education." National Commission on Safety Education of the National Education Association, Washington, D. C. (1954).