

FINAL REPORT

THE EFFECTIVENESS OF WORKSHOPS ON MANAGEMENT EVALUATION
OF TRAFFIC SAFETY PROGRAMS

by

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(The opinions, findings, and conclusions expressed in this
report are those of the authors and not necessarily those of
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ABSTRACT

Nine management evaluation workshops based on The Evaluation of Highway Traffic Safety Programs: A Manual for Managers were held in various cities throughout the United States by the Office of Manpower Development (NHTSA). The analysis reported here was undertaken on their behalf to determine the effect, if any, of the workshops on the knowledge of the attendees. Pre- and posttests, designed by Dunlap and Associates, termed "interest surveys," were administered to one hundred sixty highway safety administrators, at the beginning and end of each workshop. It was generally found that the attendees who were evaluated experienced an increase in knowledge of the materials taught, as measured by the interest survey; however, any conclusions to be drawn from the analysis are influenced by the following limitations: (1) difficulty in making interworkshop comparisons due to the number of different variables involved for each workshop (i.e., type of student, type of instructor, workshop location, and attendance), (2) ambiguity of the test items, making direct objective scoring impossible and rating difficult, and (3) self-selection in test taking which could have biased the sample of attendees evaluated.

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BACKGROUND

While much has been done in the area of highway safety in the name of evaluation, there has, until recently, been little concern with the role of evaluation in the management process. Recently, however, there has been a great deal of interest in management evaluation and in the standards encompassed in the whole process of evaluation. More attention has been paid to ensuring proper methodological design of traffic safety studies and the selection of appropriate statistical techniques for dealing with the data obtained.

In 1975, The Evaluation of Highway Traffic Safety Programs: A Manual for Managers, (1) developed at Indiana University, was published by the U. S. Department of Transportation and has since been used as a guideline to management evaluation of highway traffic safety programs. Last year management evaluation workshops based on this manual were held for highway safety administrators in various cities throughout the country by the Office of Manpower Development (NHTSA), (see Table 1).

Table 1

1976 Workshop Locations, Dates, and Number of Attendees

<u>Workshop Location</u>	<u>Workshop Date</u>	<u>Number of Attendees</u>
College Park, Md.	March 1-4	23
Denver, Co.	April 6-9	26
Washington, D. C.	April 13-16	23
White Plains, N. Y.	April 27-30	27
Kansas City, Mo.	May 11-14	20
Atlanta, Ga.	July 13-16	33
Chicago, Ill.	September 21-24	27
Fort Worth, Tx.	October 19-22	12
San Francisco, Cal.	November 16-19	42

The focus of each workshop was the

. . . development of an appreciation for the importance and use of evaluation in the management process and the meaning of terms and techniques used by the professional evaluator. The workshop does not intend to train highway safety managers to be professional evaluators. However, in order to understand evaluation and appreciate the meaning of its terms and techniques, the attendee must work through the evaluation process and work with the evaluator's tools.(2)

Each workshop lasted four days and was taught by three instructors, at least one of whom had previously taught or attended a workshop. Through the course of the year, several of the instructors gained extensive experience, often teaching as many as four of the workshops. In addition, Harding Veigel, project coordinator, attended each of the courses in an attempt to ensure consistency in relation to instruction and testing procedures. Two members of the staff of the Virginia Highway and Transportation Research Council were selected as instructors, including W. S. Ferguson, principal research analyst for the Council's Safety Section. After several workshops had been conducted and data collection procedures firmly established, this evaluation of the workshops was requested by the Office of Manpower Development (NHTSA).

PURPOSE

The purpose of the present study was to evaluate the series of workshops based on The Evaluation of Highway Traffic Safety Programs: A Manual for Managers to determine the effect, if any, of the workshops and the manual on the knowledge of the attendees.

METHOD

Subjects. Subjects were 160 highway safety administrators each of whom attended one of the workshops listed in Table 1.

Instrument. The instruments used to determine any change in the subject's knowledge as a result of attending the workshop were pre- and posttests, termed "interest surveys" which were designed by Dunlap and Associates. These were administered to attendees at the beginning and end of each workshop (see Appendix A).

Pre- and posttests were identical for each respondent, and tests were essentially the same for all workshops. It should be noted that beginning with the Atlanta workshop, the format of the test was altered slightly but the content of the questions remained basically the same (see Appendix B). Each questionnaire had 14 questions which were to be rated.

Procedure. Pre- and posttests were administered to the attendees on the first and fourth days, respectively, of each workshop. Attendees were permitted to respond anonymously, using a word, number, or symbol which could be used to identify both their pre- and posttests.

Since the questionnaire was designed as an interest survey rather than an actual test, the questions were of the open-ended discussion type rather than of the multiple-choice type which could be scored objectively. For this reason, three "judges" were selected to "rate" each question for each respondent. Each item was separated from the remainder of the items in the questionnaire; that is, each rater first rated all respondents' answers to Question 1, then all respondents' answers to Question 2, and so forth. The corresponding pre- and posttest answers for each respondent were attached together and each answer was coded (in ink visible only under ultraviolet light) with the following information: the identification of the subject, the location of the workshop, and whether the answer was from the subject's pretest or posttest.

Judges were provided with sample answers for each question and were instructed to rate test answers on this basis. Judges were also instructed not to be swayed by the length and/or apparent complexity of an answer, but to judge strictly on content. Raters were warned against judging solely on the basis of the use of certain key words used in the manual or mentioned during the workshop; that is, a key word with no other explanation was not necessarily a correct answer. Judges were further cautioned that in the case of a blank answer with a nonblank counterpart, the nonblank answer was not to be automatically scored as better than the blank answer. Again, the emphasis in judging was on "content."

Each judge received two answers to the same question from each attendee and was required to indicate which answer was "best" based on the aforementioned criteria. In each case, one answer was from the pretest and one answer was from the posttest, however, the judges were unaware of which answer was from which test, since the order was varied from question to question and the identification was coded in ink visible only under an ultraviolet light. Each judge rated the responses of all of the subjects which involved a total of 2,229 items. In each case each judge indicated that one

answer was better than another by placing a dot on that answer. A tie was indicated by placing a dot on each of the answers. The dots were erased by a coder after each judge had completed the rating of all questions and a record was kept of all of the ratings.

Answers were scored according to which answer was considered best or whether one answer was as good as the other. A score of "one" indicated that the pretest answer was considered better than the posttest answer, a "two" indicated a tie between the pre- and posttest answers, and a "three" indicated that the posttest answer was considered better than the pretest answer. The score for each question for each respondent which was given most often was the score assigned to that question for analysis. In the case of rater disagreement, a 3-way tie was settled by having a fourth judge rate the items in question.

LIMITATIONS

Before a presentation of the results or a discussion of the analysis is made, a discussion of the limiting factors involved in this study may be in order.

Although attempts were made to maintain consistency among workshops as previously discussed, a large number of variables were manipulated in this study including workshop location, instructor, background of attendees, and, in some cases, material taught. For this reason it is difficult to determine what factor or factors account for any differences which may exist among the workshops. This should be considered in relation to the interpretation of interworkshop comparisons; if one workshop was judged more successful than another, it could be the result of any of these factors or of an interaction among them.

A second limiting factor was the power of the instrument. Designed not to alarm or offend the attendees, this "interest survey" was not a true knowledge test; items were open-ended and somewhat ambiguous, making direct objective scoring impossible and judging or rating difficult.

Another limitation was self-selection in test taking. In some cases it was not possible to find matching pre- and posttests, and in many cases attendees, for one reason or another, were not sampled. Out of the total number of attendees for all workshops, only 69% responded to the questionnaires and had pre- and posttests which could be matched. This bias in the sampling could also influence the results of the study.

ANALYSIS

Since scoring of the correctness of the respondents' answers was conducted on a judgemental basis, it was considered essential that the analysis include an examination of agreement among raters. As seen in Table 2, rater agreement was rather high, with at least two of the three raters reaching a concensus between 73% and 76% of the time. Agreement was also extremely consistent across judges.

Table 2
Percent Agreement Among Raters

	<u>Rater #1</u>	<u>Rater #2</u>
Rater #2	.73	—
Rater #3	.76	.74

Table 3 shows, for each workshop and for the total, the percentage of participants whose pretests were scored better than their posttests, the percentage of participants whose pretests and posttests were scored as ties, and the percentage of participants whose posttests were scored as being better than their pretests. It may be seen that, for all workshops, over 60% of the attendees had tie scores for pre- and posttests and, in most cases, over 70% of the questionnaires were rated as ties. The Washington, D. C. workshop had the greatest percentage of tie scores (78.2%) and the Denver workshop had the lowest (61.9%). There are two possible interpretations for tie scores — either the respondents were unfamiliar with the material when the workshop began and did not increase their familiarity over the course of the lectures, or the respondents knew the material at the onset and thus could not substantially improve their levels of knowledge. Under this interpretation, it may not have been surprising to find that participants in the Washington, D. C. workshop had the greatest number of tie scores since it is possible that they may have been more familiar than other respondents with the material covered in the manual.

As may also be seen in Table 3, for all workshops except for the one in Atlanta, the percentage of posttests scored higher than pretests was greater than the percentage of pretests scored higher than posttests. Using the Wilcoxon Signed Rank Test,⁽³⁾ these differences were found to be statistically significant at the .05 level for the College Park and Fort Worth workshops, and statistically significant at the .01 level for the Denver, White Plains, and San

Francisco workshops. Thus, it does appear that generally there was some change in knowledge from pretest to posttest for the workshops as a whole, and in particular, for those workshops where statistically significant differences were found. Another interesting finding was that the results of the workshops were different from each other. Looking at the distributions of pretests scored better, posttests scored better, and tie scores in Table 3, it may be noted that these distributions are significantly different for all of the workshops ($\chi^2 (16) = 39.2, p < .01$). It must be recognized, however, that although the workshops differ from each other, there is no way to determine what actually made one workshop different from or better than another. With uncontrolled factors such as location, instructor, background of attendee, and material taught, it is not possible to conclude that one instructor was more effective than any other instructor in teaching the material from the manual.

Table 3

Ratings of Pretests and Posttests for Each Workshop

Workshop Location	Number and Percentage of Matched Respondents	Percent Pretest Better	Percent Ties	Percent Posttest Better
College Park	15 (65%)	9.7	72.3	18.1 *
Denver	15 (58%)	10.0	61.9	28.1**
Washington, D.C.	18 (78%)	8.0	78.2	13.9
White Plains	18 (67%)	6.3	77.4	16.3**
Kansas City	18 (90%)	11.9	68.7	19.4
Atlanta	17 (52%)	11.9	77.6	10.5
Chicago	17 (63%)	9.2	74.8	16.0
Fort Worth	9 (75%)	7.2	73.0	19.8*
San Francisco	33 (79%)	11.5	68.4	20.1**
Total	160 (69%)	9.8	72.1	18.1**

* p < .05

** p < .01

A breakdown of the ratings for each question for all workshops is shown in Table 4. In most cases, pretests and posttests were rated as ties, however, no statistical analyses were made. An item analysis by individual workshop is included in Appendix C. Since each question corresponds to a particular content area, it is possible to determine which questions tend to discriminate between learners and nonlearners and possibly, which content area was learned most readily by respondents at a particular workshop. For instance, for the workshops as a whole, 49% of the respondents had successfully learned how to state their project objectives in accordance with the course outline (Question 4). This question was also a particularly good one in that its answer was objective in nature and could be easily scored. On the other hand, very few respondents learned how to anticipate problems in data collection (Question 6) and, in fact, since more pretest answers were better than posttest answers, some respondents may have become confused on this issue during the course. Similar types of interpretations can be drawn for the individual workshops from the data in Appendix C.

Table 4
Item Analysis for All Workshops

Question Topics	Percent Pretest Better	Percent Ties	Percent Posttest Better
I - Introductory Questions			
(1) Administrative evaluation	10.7	74.8	14.5
(2) Effectiveness evaluation	10.7	70.4	18.9
(3) Procedure for selecting projects for effectiveness evaluations	8.2	62.9	28.9
II - Project Specific Questions			
(4) Quantitative objectives for project	10.1	40.9	49.1
(5) Data needed	8.8	78.0	13.2
(6) Problems in data collection procedures	14.5	76.7	8.8
(7) Data contamination or bias	16.4	65.4	18.2
(8) Limitations in the study design	15.7	66.7	17.6
(9) Analysis of data and statistical techniques	6.3	68.6	25.2
(10) Level of significance	1.3	87.4	11.3
(11) Correlation technique	3.1	91.2	5.7
(12) Positive results	9.4	77.4	13.2
(13) Negative results	13.2	72.3	14.5
(14) Marginal results	8.8	76.7	14.5

SUMMARY

While data are available on the ratings of the individual items on the pre- and posttests for all workshops, in view of the limiting factors already discussed, restrictions in the interpretation of the data must be recognized. As mentioned previously, the reader is cautioned against making direct comparisons of workshops which involve a single workshop characteristic, such as instructor or setting. Since the workshops differed on a number of variables, including type of student, type of instructor, location, and attendance, it is not possible to determine exactly why one workshop was more successful than another. Other considerations in relation to interpretation of findings should include the limiting factors of the power of the instrument and the self-selection process in test taking. Some of the questions were ambiguous enough that they may not have been interpreted the same way by all of the attendees. Also, since the questions were open-ended, answers were often incomplete enough to make rating difficult. As far as self-selection is concerned, it is not possible to determine if any particular type of person either took the test or refused to take the test. It should be noted, however, that for the workshops as a whole, 31% of the attendees were missing either the pretest, the posttest, or both, and thus were not included in the analysis.

With these considerations in mind, it can be concluded from this analysis that those persons who attended the workshops on management evaluation of highway traffic safety programs (and who were subsequently tested) apparently experienced an increase in knowledge of the materials taught, as measured by the interest survey.

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3. Ostle, Bernard, Statistics in Research, Iowa State University Press, Ames, Iowa, 1963.

APPENDIX A

ORIGINAL QUESTIONNAIRE USED IN THE COLLEGE PARK, DENVER,
WASHINGTON, D. C., WHITE PLAINS, AND KANSAS CITY WORKSHOPS

INTEREST SURVEY

This interest survey has been developed to obtain the following information:

- . Your ideas about highway safety evaluation
- . Highway safety projects being conducted in (or planned for) your area
- . Your needs for knowledge of selected evaluation techniques and terms

Please fill out the interest survey carefully. Your answers will assist us in making the workshop experience more valuable to you. Specifically, your comments will provide us with materials for discussion in subsequent workshop sessions. The questions posed will also serve to sensitize you to the evaluation concerns we will be addressing in the workshop program. In addition, your answers will aid us in determining the proper emphasis for selected workshop sessions.

Since the workshop emphasizes effectiveness evaluations, most of the survey questions are concerned with that type of evaluation effort. However, one survey item is addressed to administrative evaluation. Remember the following:

- . An administrative evaluation involves monitoring project activities to determine if they have been accomplished in accordance with the project plan.
- . An effectiveness evaluation involves analyzing project effects to determine the impact of the project on crash reduction or severity.

Please answer all questions. If you do not have an answer or opinion for any one item, please so state. In other words, do not leave any part of the survey unanswered.

1. Please list below one project being conducted in or planned for your area that you consider to be an appropriate candidate for an administrative evaluation only.

Project:

Reasons: (Why is it appropriate for an administrative evaluation only?)

2. Please list below one project being conducted in or planned for your area that you consider to be an appropriate candidate for an effectiveness evaluation.

Project:

Reasons: (Why is it appropriate for an effectiveness evaluation?)

3. If you have several projects which are appropriate candidates for effectiveness evaluations and have sufficient funds to conduct an evaluation of only one of them, on what basis would you make your decision?

4. Please complete this section for one actual or planned highway safety project of major interest to you that you consider an appropriate candidate for an effectiveness evaluation. Complete the remainder of this form in terms of how you think the project should be conducted and evaluated regardless of any current project effort.

THE PROBLEM:

- a. What is the specific highway safety problem addressed by this project?

- b. Brief description of the project:

- c. Please list precise quantitative objectives for the project:

APPENDIX B

REVISED QUESTIONNAIRE USED IN THE ATLANTA, CHICAGO,
FORT WORTH, AND SAN FRANCISCO WORKSHOPS

Name: _____

INTEREST SURVEY

This interest survey has been developed to obtain the following information:

- Your ideas about highway safety evaluation
- Highway safety projects being conducted in (or planned for) your area
- Your needs for knowledge of selected evaluation techniques and terms

Please fill out the interest survey carefully. Your answers will assist us in making the workshop experience more valuable to you. Specifically, your comments will provide us with materials for discussion in subsequent workshop sessions. The questions posed will also serve to sensitize you to the evaluation concerns we will be addressing in the workshop program. In addition, your answers will aid us in determining the proper emphasis for selected workshop sessions.

Since the workshop emphasizes effectiveness evaluations, most of the survey questions are concerned with that type of evaluation effort. However, one survey item is addressed to administrative evaluation. Remember the following:

- An administrative evaluation involves monitoring project activities to determine if they have been accomplished in accordance with the project plan.
- An effectiveness evaluation involves analyzing project effects to determine the impact of the project on crash reduction or severity.

Please answer all questions. If you do not have an answer or opinion for any one item, please so state. In other words, do not leave any part of the survey unanswered.

1. Please list below one project being conducted in or planned for your area that you consider to be an appropriate candidate for an administrative evaluation only.

Project:

Reasons: (Why is it appropriate for an administrative evaluation only?)

2. Please list below one project being conducted in or planned for your area that you consider to be an appropriate candidate for an effectiveness evaluation.

Project:

Reasons: (Why is it appropriate for an effectiveness evaluation?)

3. If you have several projects which are appropriate candidates for effectiveness evaluations and have sufficient funds to conduct an evaluation of only one of them, on what basis would you make your decision?

4. Listed below are three of the highway safety problem areas most often named by previous workshop participants as being of particular interest. Please answer the questions in this section for the one highway safety project which is most like the projects you are involved with, or which is of the most interest to you. Complete the remainder of this form in terms of how you think the project should be conducted and evaluated regardless of any current project efforts. (Please put a check in the box to the left of the project chosen).

 1

Problem # 1: Several locations in your area have been identified as high accident locations. As part of an effort to reduce the risk involved in travelling through these hazardous areas, a program of selective enforcement has been instituted. Involved in this program will be the training of officers and funding for additional man-hours of duty.

 2

Problem # 2: As a result of the increasingly high proportion of alcohol-related crashes in your area, an alcohol countermeasures program has recently been instituted. For this project, treatment programs for drunk drivers have been substituted for the usual legal sanctions for driving while intoxicated. (This evaluation will not include such aspects of the project as increased enforcement or public information efforts).

 3

Problem # 3: A larger and larger number of pedestrian accidents are occurring in your area. Since it has been determined that a majority of the pedestrians involved were "at fault" in these accidents, a public information campaign has been instituted to inform the public of safe pedestrian practices.

- a. Please list precise quantitative objectives for the project:

j. What would you do with the project if the results were negative?

k. What would you do with the project if the results were marginal?

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APPENDIX C

ITEM ANALYSIS BY WORKSHOP

<u>Question #</u>	<u>% Pretest Better</u>	<u>% Ties</u>	<u>% Posttest Better</u>
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FOR ALL WORKSHOPS

1	10.7	74.8	14.5
2	10.7	70.4	18.9
3	8.2	62.9	28.9
4	10.1	40.9	49.1
5	8.8	78.0	13.2
6	14.5	76.7	8.8
7	16.4	65.4	18.2
8	15.7	66.7	17.6
9	6.3	68.6	25.2
10	1.3	87.4	11.3
11	3.1	91.2	5.7
12	9.4	77.4	13.2
13	13.2	72.3	14.5
14	8.8	76.7	14.5

Workshop No.1: College Park (Pilot) March 1-4, 1976

1	5.9	88.2	5.9
2	11.8	70.6	17.6
3	17.6	35.3	47.1
4	0	58.8	41.2
5	17.6	76.5	5.9
6	0	94.1	5.9
7	35.3	58.8	5.9
8	5.9	88.2	5.9
9	5.9	47.1	47.1
10	0	88.2	11.8
11	0	88.2	11.8
12	11.8	64.7	23.5
13	17.6	76.5	5.9
14	5.9	76.5	17.6

Workshop No. 2: Denver, April 6-9, 1976

1	20.0	73.3	6.7
2	6.7	60.0	33.3
3	6.7	60.0	33.3
4	0	13.3	86.7
5	6.7	66.7	26.7
6	33.3	46.7	20.0
7	6.7	66.7	26.7
8	26.7	40.0	33.3
9	0	73.3	26.7
10	6.7	80.0	13.3
11	13.3	86.7	0
12	6.7	80.0	13.3
13	0	53.5	46.7
14	6.7	66.7	26.7

Question # % Pretest Better % Ties % Posttest Better

Workshop No. 3: Washington, D. C. April 13-16, 1976

1	11.8	70.6	17.6
2	0	82.4	17.6
3	17.6	64.7	17.6
4	0	52.9	47.1
5	5.9	82.4	11.8
6	11.8	82.4	5.9
7	23.5	58.8	17.6
8	23.5	64.7	11.8
9	5.9	70.6	23.5
10	0	94.1	5.9
11	0	94.1	5.9
12	5.9	88.2	5.9
13	0	94.1	5.9
14	5.9	94.1	0

Workshop No. 4: White Plains, April 27-30, 1976

1	16.7	55.6	27.8
2	0	88.9	11.1
3	0	55.6	44.4
4	0	44.4	55.6
5	11.1	77.8	11.1
6	5.6	94.4	0
7	5.6	72.2	22.2
8	16.7	72.2	11.1
9	22.2	61.1	16.7
10	0	94.4	5.6
11	0	100.0	0
12	5.6	88.9	5.6
13	5.6	88.9	5.6
14	0	88.9	11.1

Workshop No. 5: Kansas City, May 11-14, 1976

1	5.6	77.8	16.7
2	5.6	77.8	16.7
3	5.6	77.8	16.7
4	11.1	27.8	61.1
5	5.6	77.8	16.7
6	16.7	66.7	16.7
7	11.1	77.8	11.1
8	16.7	66.7	16.7
9	5.6	66.7	27.8
10	0	83.3	16.7
11	5.6	88.9	5.6
12	16.7	66.7	16.7
13	33.3	50.0	16.7
14	27.8	55.6	16.7

Question # % Pretest Better % Ties % Posttest Better

Workshop No. 6: Atlanta, July 13-16, 1976

1	13.3	80.0	6.7
2	13.3	66.7	20.0
3	13.3	66.7	20.0
4	13.3	60.0	26.7
5	20.0	73.3	6.7
6	20.0	73.3	6.7
7	13.3	73.3	13.3
8	0	93.3	6.7
9	0	86.7	13.3
10	0	93.3	6.7
11	0	100.0	0
12	13.3	80.0	6.7
13	26.7	66.7	6.7
14	20.0	73.3	6.7

Workshop No. 7: Chicago, September 21-24, 1976

1	11.8	82.4	5.9
2	17.6	58.8	23.5
3	0	76.5	23.5
4	5.9	64.7	29.4
5	0	94.1	5.9
6	17.6	76.5	5.9
7	11.8	58.8	29.4
8	29.4	58.8	11.8
9	5.9	64.7	29.4
10	5.9	88.2	5.9
11	5.9	70.6	23.5
12	5.9	94.1	0
13	5.9	82.4	11.8
14	5.9	76.5	17.6

Workshop No. 8: Fort Worth, October 19-22, 1976

1	11.1	77.8	11.1
2	11.1	66.7	22.2
3	22.2	44.4	33.3
4	22.2	33.3	44.4
5	0	77.8	22.2
6	0	88.9	11.1
7	0	66.7	33.3
8	11.1	77.8	11.1
9	11.1	66.7	22.2
10	0	88.9	11.1
11	0	100.0	0
12	0	77.8	22.2
13	11.1	77.8	11.1
14	0	43.8	56.2

<u>Question #</u>	<u>% Pretest Better</u>	<u>% Ties</u>	<u>% Posttest Better</u>
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Workshop No. 9: San Francisco, November 16-19, 1976

1	6.1	72.7	21.2
2	21.2	63.6	15.2
3	3.0	69.7	27.3
4	27.3	24.2	48.5
5	9.1	75.8	15.2
6	18.2	72.7	9.1
7	24.2	60.6	15.2
8	12.1	54.5	33.3
9	3.0	75.8	21.2
10	0	81.8	18.2
11	3.0	93.9	3.0
12	12.1	66.7	21.2
13	15.2	66.7	18.2
14	6.1	78.8	15.2