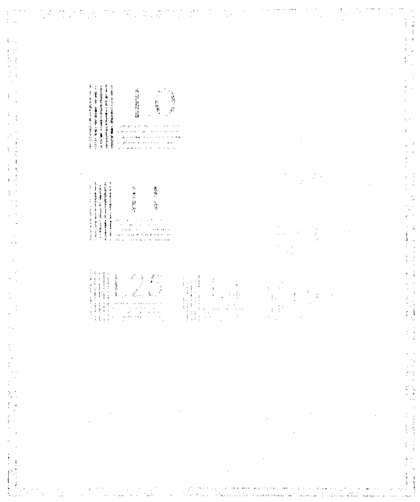

U.S. DEPARTMENT OF JUSTICE
LAW ENFORCEMENT ASSISTANCE ADMINISTRATION
NATIONAL CRIMINAL JUSTICE REFERENCE SERVICE
WASHINGTON, D.C. 20531

6/24/77

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[illegible]

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[illegible]

[illegible]

1. [illegible]

2. [illegible]

A major obstacle to the use of such a device could have been [illegible] ... resistance [illegible] to allowing interviewers carrying such a device to [illegible]

[1] This was, of course, desirable because of the evaluative connotations which might be associated with such descriptive terms.

a higher support was used, but at times the only otherwise suitable base available in the respondent's living room was a coffee table.)

Further, respondents were able to make consistent and rather fine discriminations among the light levels depicted in the SLS. There was a high rank-order correlation between the levels of light recorded in front of their homes and the levels of light they identified as most like those on their blocks when looking into the instrument. In using the SLS, respondents tended to over-estimate the brightness of lighting of their block. However, those living in less well lighted areas tended to select darker settings on the SLS as representative of their blocks than those living in better lighted areas. Given these results, the investment of additional time to develop a more sophisticated version of the SLS and to refine the procedure for its use seemed worthwhile.

The team then contacted Dr. S. K. Guth of the Department of Psychology at Indiana University who has conducted extensive research into the physiological aspects of light perception and discrimination. Dr. Guth's suggestions in regard to the design of the SLS, the details of its interior lighting, and the field procedures used were solicited in an extended meeting.

After hearing the project's objectives described and seeing the first version of the SLS, Dr. Guth was generally optimistic about the possibility of using an instrument of this type in obtaining measures of citizens' perceptions and preferences with regard to street lighting. He pointed out several possible sources of difficulty in the use of the SLS, but felt that these would account for only a fraction of the total variation in citizens' responses.

A number of specific modifications were made in the next version of the SLS on the basis of several suggestions made by Dr. Guth and the experience gained in the first pretest. These modifications were described below.

The photograph originally on the rear wall viewed by the respondents was replaced with a miniature street scene of two model homes from an electric train set.[2] This alteration was made in response to the comments of some respondents in the first pretest to the effect that they had difficulty relating the light levels in the SLS to those seen on the street because of the two-dimensional nature of the object being viewed.

In addition, the four bulbs were replaced by a single bulb in order to more closely simulate the point source lighting found on city streets. The reflective material on the interior was replaced by a non-reflective background of flat black paint to more closely approximate the ambiant darkness of residential streets at night. All light seen by the respondent was thus reflected from the surface of the model houses.

The change to a single bulb required a more powerful source of energy to produce the same range of lighting. A choice thus had to be made between installing more powerful and heavier batteries, and altering the design of the SLS to utilize household current. The latter choice would require that interviewers ask respondents to allow the use of their household outlets. Since this seemed like an awkward field situation and a number of potential difficulties could be foreseen, the team decided to rely on the heavier batteries. The batteries were, however, moved to an enlarged control box so that the interviewer experienced their

[2] Train set-up models were selected because 1) they were built to a known scale, 2) they were relatively easy to obtain and inexpensive, and 3) they were standardized so that a number of identical scenes could be constructed.

weight rather than the respondents who occasionally held the SLS to eye level.

The control box dial was recalibrated to reflect the effects of alterations of the interior of the SLS on lighting levels. Because the brightness of the light would now vary substantially from place to place within the interior, an arbitrary measurement point had to be selected. This posed no problem since readings taken at any one point should change in a pattern which was linear with changes occurring at any other point. Calibrating measurements were taken at a point between the two miniature houses on a plane with the front walls of the models.

The field procedure used in obtaining measures of respondents' perceptions was altered for the second round of formal pretesting. Team members anticipated that respondents' pupils might adjust differently to rising and falling levels of light, and that this difference might affect results. There was, moreover, a question as to whether accurate results could be obtained by having the respondents or the interviewers operate the rheostat dial. Accordingly, a series of informal pretests of different procedures were conducted to determine the effects of alternative patterns of light changes on respondents' perceptions.

Subjects in these pretests were asked to identify the level of light in the SLS which was most like that found on their blocks when:

1) the rheostat dial was turned upward from a setting of zero by the interviewer;
2) the rheostat dial was turned downward from a setting of five footcandles by the interviewer;
3) the rheostat dial was turned upward by the respondent;
4) the rheostat dial was turned downward by the respondent.

No systematic variation in the difference between the estimates made using an upward and a downward setting were associated with the difference between interviewer or interviewee control. Thus, an initial decision was made to use both techniques in the second round of pretesting in hopes of making a selection between techniques on the basis of information gathered there.

One difficulty foreseen, however, was that respondents when allowed to manipulate the knob themselves, would depend on tactile rather than visual cues in attempting to replicate their initial choice of lighting. If so, they might position the pointer of the control knob on the second trial by recalling its position on the first setting rather than visually judging the light level. A crude effort at correcting for this was made in the pretest by having interviewers change the orientation of the control box each time it was presented to respondents for manipulation, making respondents' reliance on tactile cues more difficult and less likely. Changes in instrumentation (described below) were, however, considered necessary for a more satisfactory resolution of this problem.

A second pretest was conducted in January 1974. Respondents were selected by first identifying four block faces which were representative of different combinations of street lighting and road repair conditions, and then securing names and addresses of citizens living on those blocks from the Bloomington city directory. A letter of introduction was sent to each resident on these blocks, but no phone calls were placed to arrange interview times. Twenty-two respondents were interviewed in this pretest.

While the majority of the interviews in the first pretest were conducted by a lone, male interviewer, teams of one male and one female

were used in the second pretest. This strategy was adopted in an effort to overcome the reservations that female respondents might have about allowing unknown men into their homes when they were alone. In addition, the interview proved easier to administer with two interviewers. One team member could administer the oral survey items and record the responses to questions concerning the SLS and photograph display, while the other member manipulated the instruments. This procedure made interviews far smoother than they had been with a lone interviewer attempting both tasks.

The more representative cross-section of citizens contacted in the second pretest proved as willing to allow the SLS into their homes and to look into it as had the initial group of respondents who were atypical by nature of their social and civic activism and who had been extensively "primed" for the interviews. When citizens asked what the SLS was, a simple response of "This is a Street Lighting Simulator and you will have a chance to look inside it during the interview," proved to be a sufficient answer.

This pretest produced a substantially smaller rank-order correlation between meter readings taken in front of respondents' homes and the light levels identified as being most like those on their blocks than the first pretest had. The relationship was, however, in the "expected" direction with those living on more brightly lighted streets tending to select higher settings.[3] The pretest demonstrated that no consistent

[3]The relative weakness of this relationship caused no great concern because the reference in the questions concerning perceptions was to overall levels of lighting on the block, while objective measures were taken only in front of homes. Since light levels are quite variable over block faces, a single reading may misrepresent the full impression one gets by driving or walking along the block.

differences in responses were associated with the difference between interviewer and respondent control of the rheostat dial. No administrative problems were encountered with allowing respondents to manipulate the dial.

The factor which seemed to most influence the accuracy with which individuals matched their selections of light levels on paired trials (turning the light "up" once and "down" once) was experience in making the selection. Respondents consistently made closer matches in later pairs of selections, regardless of whether the interviewer or the respondent first operated the dial. Since changing who adjusted the light setting could be one way of preventing respondents from feeling that they were being asked to repeat the same task, it seemed wise to retain both procedures in an effort to obtain more measures of citizens' perceptions.

In addition to changing the procedure for presenting the stimuli in this second phase of pretesting, the control box was held at the side of the SLS to simulate a dial built into the instrument. This required that the interviewer stand near the respondent while using the SLS. Respondents did not seem uncomfortable with this and the decision was made to simplify construction of the SLS by placing the control dial on the side of future versions of the instrument.

Final Model

Following this phase of pretesting, an entirely new box was constructed for the SLS. The alterations in design included the following.

1) The exterior dimensions were changed to 12 inches in width, 12 inches in height, and 16 inches in depth to allow the distance from the viewers' eye to the model houses to be scaled to

reflect representative distances from the front of one house to another across typical residential streets.

2) The batteries were returned to the SLS and placed out of sight below a false floor.

3) The rheostat was built into the right hand wall of the instrument and its control knob was replaced with a round knob which would not allow respondents to rely on tactile cues in selecting settings.

4) The viewing hood, designed to block out ambiant light while respondents were looking into the instrument, was inletted to more closely fit facial contours, making it easier for respondents to shield their eyes from room light.

5) Because additional model houses of the type used in the previous versions were unexpectedly unavailable, and homes of the same scale could not be found in sufficient number, a single suburban ranch-style model had to be used inside the instrument. This seems to have posed no problems.

In addition, the exterior of the SLS was given an attractive polished walnut finish. A stand for the instrument was made by altering the picture board (to be described in a later report) so that it could support the SLS. This avoided the necessity of using household items to construct make-shift supports at each interview site.

This new SLS was used in a third small-scale pretest involving 44 Bloomington residents living on blocks where detailed profiles of lighting conditions had earlier been obtained during the process of developing procedures for use of the outdoor light meter. Leters introducing the study were sent to each household listed on these blocks in the city

directory. The principal concern with regard to the SLS in this pretest was to discover citizen reactions to the finished instrument and to the reformulated procedures used in obtaining measures of their perceptions and preferences.

This procedure involved asking respondents to manipulate the rheostat dial themselves while selecting eight brightness levels from the range of light reproducible in the SLS. Respondents were asked to select two settings of the dial at which the brightness level in the SLS looked most like 1) the lighting currently on their block, overall, 2) the lighting they would most like to have on their block, overall, 3) the lighting currently provided directly in front of their homes, and 4) the lighting they would like to have in front of their homes.

The pairs of selections were to be made first by turning the dial upward from a setting of complete darkness and then by turning it downward from the brightest setting. Respondents were asked to look away from the instrument after each selection as the interviewer recorded the setting and turned the dial to the appropriate origin for the next trial.

It was feared that "fatigue" would set in over the course of so many trials, but the pretest revealed that citizens matched selected settings as well in later trials as in the earlier ones and did not lose interest in the exercise.

These results were sufficiently conclusive that the version of the SLS used in this third phase of pretesting, along with the procedure for its use was carried into the final, large-scale pretest without further change.

In addition to the basic procedure, interviewers were instructed to take the following precautions to insure reliable measures. First,

they were to seat respondents so that they faced into the major light sources in the room. This helped reduce the ambiant lighting that might enter the SLS during viewing. Secondly, interviewers were directed to check the voltage level generated by the batteries just before each interview to insure that use had not drained them to a point where the lighting in the instrument would be affected. Throughout the project battery charges fluctuated by less than the amount necessary to produce a one percent change in interior lighting, suggesting that this was not a source of invalidity warranting any major concern.

Conclusions and Suggestions

The specific findings from our larger pretest conducted in Indianapolis during March and April 1974, will be presented in a later report. In general, the SLS proved to be quite useful in obtaining objective, replicable measures of citizens' perceptions and preferences. Moreover, despite its weight, bulk and "technical" nature, the instrument was physically manageable in a survey research setting. In this larger pretest we experienced a higher proportion of refusals than we had during the earlier pretests in Bloomington. We will undertake an analysis of refusals by neighborhood type to ascertain if variation in neighborhood SES characteristics affects the rate of successful interviews with the SLS.

Future studies using a Street Lighting Simulator may want to consider making the following changes in the design in order to ease the use of the instrument or extend its capacity.

First, a telescoping stand which can be set at various heights and can be attached to the SLS for transport, could be constructed to

ease the task of adjusting viewing heights to different respondents and situations. This would help insure that the instrument could be positioned so that respondents could look into it comfortably, and would increase the stability of the SLS during use. Irregular floor surfaces made the Street Lighting Photograph Display a highly precarious base for the SLS.

Secondly, the door which provides access to the interior of the box is currently on the right side of the instrument. This means that the wires connecting the rheostat dial to the light system are subject to stress each time the door is opened. This could create maintenance problems on instruments used in a large number of surveys. It might, therefore, be wise to move the door to the left side of the box since the control dial should remain on the right for the ease of the majority of respondents.

Finally, the investigation of the possibility of adding the dimension of color to the capacities of the SLS would seem to be worthwhile, though the technology for doing so may not exist yet.

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