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The Prevalence and Extent of Drinking in Iowa, 1961

A Replication and an Evaluation of Methods¹

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THE PREVALENCE and extent of beverage alcohol use among adult Iowans in 1958, sociocultural variations in these measures of drinking behavior, and certain methodological problems of survey studies of drinking, have been the subject of earlier investigations (1, 2). The present report describes a replication study which further evaluates the methods employed, especially the sampling design and interviewing procedure, and tests the reliability of the previous findings.

METHODS

The methods of the present (1961) study, with certain exceptions to be noted, were similar to those employed in the earlier (1958) work. A quota sampling design was again used. Interviews were conducted with 1,213 respondents (compared with 1,185 in the 1958 survey) chosen to represent the adult population of Iowa.⁴ Forty-three interviewers (compared with 33 in 1958) did the field work, using a structured interview schedule which required approximately 35 minutes to complete.

Perhaps the most significant procedural departure from the first study, and one which was unavoidable, concerned the time of year when the interviews were conducted. Whereas the field work in 1958 was con-

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⁴ According to the 1960 U.S. Census (3) the adult (age 21 years and older) population of Iowa numbered 1,664,371.

ducted during the summer months, the 1961 interviewing was done during February and March.

Sample Representativeness

Although quotas were again set for sex, age and residence, the observed distribution of these characteristics was checked against the expected distribution based on the 1960 U.S. Census (3). No significant discrepancies were found. A slight error in the age distribution observed in the 1958 survey did not occur in the replication.

Five check factors, independent of the sampling design, were used further to test the sample's representativeness: (1) education, (2) religious affiliation, (3) family income, (4) possession of a driver's license, and (5) a factor more closely related to drinking behavior—possession of an individual liquor permit.

Table 1 shows that, with the possible exception of education, the distribution of our sample on the several check factors differed little from the expected distribution. In the case of education, using adults aged 25 and older as a base, persons with no more than a grade-school

TABLE 1.—Comparisons of Observed and Expected Distributions of Selected Check Factors

	SAMPLE		UNIVERSE	DIFF.
	N	%	%	%
<i>Education*</i>				
None	3	0.2	0.4	-0.2
Grade school (1-8 yr.)	304	26.8	37.3	-10.5
High school (9-12 yr.)	613	54.3	45.9	+8.4
College (13 yr.+)	206	18.2	15.9	+2.3
<i>Religion*</i>				
Catholic	253	20.8	21.4	-0.6
Lutheran	228	18.8	18.8	0
Methodist	271	22.3	17.0	+5.3
Other Protestant	397	32.5	38.3	-5.8
None	39	3.2	3.3	-0.1
<i>Income*</i>				
Under \$3,000	239	21.7	25.3	-3.6
\$3,000-4,999	315	28.7	23.8	+4.9
\$5,000-5,999	169	15.4	12.8	+2.6
\$6,000-9,999	275	25.0	27.3	-2.3
\$10,000+	99	9.0	10.6	-1.6
<i>Ownership of:</i>				
<i>Driver License*</i>	957	78.8	77.4	+1.4
<i>Liquor Permit*</i>	217	17.8	19.0	-1.2

* Sources: *Education and income*: U.S. Census, 1960 (3). *Religion*: Iowa State Department of Health, Division of Vital Statistics, Annual Report, 1960. *Driver Licenses*: Drivers License Division, Iowa State Department of Public Safety [personal communication]. *Liquor permits*: Iowa Liquor Control Commission, Twenty-sixth Annual Report, 1960-61.

education were apparently underrepresented in the sample. If the discrepancy noted is due to sampling design and not to respondents' over-reporting,⁵ the error would inflate⁶ the prevalence value for the state by approximately 2 percentage points and would have even less effect on the extent of drinking rates. Comparisons of the sample distribution on the other check factors of religion,⁶ income,⁷ ownership of a driver's license⁸ and an individual liquor permit⁹ with their expected distributions revealed no reason to suspect the representativeness of the sample.

Inaccessibility. Another potential source of bias was examined for the first time in the replication. To combat possible biases due to subjects who are not at home during working hours, interviewers were instructed to gather approximately one-third of their quotas in the evenings and on week-ends. The absence of significant differences in either the prevalence or the extent of drinking, when time of the interview was controlled, makes weekday-daytime interviewing an unlikely source of bias. While it was discovered that working women have a higher rate of drinkers than nonworking ones, the working women were not significantly underrepresented in the sample, and in any case they do not constitute a group large enough to affect the prevalence rate significantly.

Interviewer Performance as a Source of Bias

Of the 43 interviewers, 27 were "regular" interviewers and 16 were substitutes. All but one were women. The average age was 48 years and nearly half of them had some college education. The regular interviewers had been with the Iowa Poll an average of 3 years and 4 months. Fourteen of them had participated in the 1958 survey.

⁵ For a discussion of educational bias in quota sampling see Stephan and McCarthy (4), p. 147 and pp. 151-152.

⁶ Iowa law requires marriage license applicants to state their specific religious affiliation. Assuming that marriage rates do not differ among the various religious groups, these data should give a reasonably accurate picture of the relative size of each religious group in Iowa. In the 1958 survey, the question, "What is your religious preference?" was answered by 28.6 per cent simply as "Protestant." In the 1961 survey more pains were taken to secure a specific denomination. This change renders comparisons between the two studies by religious affiliation dubious; it did have the effect of reducing the proportions of unspecified Protestants and bringing the sample closer to the distribution of the total population (1).

⁷ Each respondent was asked, "What was the approximate total income of this family during the past 12 months?" This is essentially the same wording as that used by the U.S. Census. Omitted from the analysis were 116 respondents who failed to give their annual family income.

⁸ As a validity check, respondents were asked to produce their driver's license; they did so except in a few cases in which the license was not immediately available.

⁹ Under Iowa's state monopoly system, alcoholic beverages (other than 3.2-per cent beer) can be purchased legally only in state owned and operated "package" stores by adults who have purchased an individual permit book costing \$1 and valid for 1 year.

Interviewer Drinking Habits. In the 1958 study, abstaining interviewers reported lower rates of drinkers and lower rates of "frequent" drinkers—i.e., Q-F Index types 3, 4 and 5 (2)—than did drinking interviewers. Essentially the same discrepancy reappeared in the present study. The abstaining interviewers reported that 51 per cent of their respondents drink while the drinking interviewers reported a prevalence rate of 66 per cent. If all of the discrepancy is attributable to either group of interviewers the prevalence rate of 59 per cent which we report is biased by a maximum of 8 percentage points. However, this seems unlikely in view of the evidence to be presented later.

To account for the discrepancy, it is conceivable that drinking and abstaining respondents refused interviews to interviewers whose attitudes about alcohol were contrary to their own. But this is improbable. In the first place, the major subject of the interview—drinking habits and attitudes—was concealed until the interview was well under way and virtually no interviews were terminated once they had begun. Furthermore, abstaining and drinking interviewers encountered essentially the same refusal rate, and neither drinkers nor abstainers were disproportionately represented among the refusers even when interviewer drinking habits were held constant.¹⁰ Thus it appears unlikely that refusals account for the differences in the results reported by drinking and abstaining interviewers.

Further analysis points to two more-likely explanations of the discrepancy. First, it appears that both abstaining and drinking interviewers selected some of their respondents for their known drinking behavior (or for other related reasons); and secondly, the interviewers' own attitudes toward alcohol probably influenced the response, or the interviewers' interpretation of the response, or both.

If in addition to eliminating respondent refusal as the source of error, we can also rule out interviewer influence and interpretation at an early point in the interview, there will remain a stronger probability of some interviewer selection of respondents. The first mention of alcoholic beverages in the interview involved a series of 25 attitudinal statements.¹¹ This list of statements was handed to the respondent and he was asked to indicate whether or not he personally would make each statement. Respondents who were interviewed by abstaining interviewers were, as a group, *consistently and from the very first item*, more inclined to en-

¹⁰ Interviewers were provided with tally sheets for tabulating the number of refusals and for recording certain pertinent information about them, including the answer to the question, "Do you ever have occasion to use alcoholic beverages such as liquor, wine, or beer—or are you a total abstainer?" This is the question-wording developed by the Gallup Poll organization and used by them since 1945 (5). In the 1961 survey the refusal rate was 19 per cent—about 2 percentage points lower than in 1958. The decrease occurred principally in rural areas and probably reflects the fact that interviewing for the second survey was done during the slack farm season.

¹¹ Included among these items were the 18 statements which made up the "Iowa Scale of Definitions of Alcohol" plus 3 additional positive items and a total of 4 negative items (6, p. 270).

dorse unfavorable statements and less inclined to accept favorable statements than were those interviewed by drinking interviewers.

Since there had been no mention of alcohol prior to these questions, and since the respondent read the statements himself and recorded his own answers, there would have been little or no opportunity for the interviewers either to influence the respondent or to place his own interpretation on the responses. Thus the likelihood increases that at least some of the interviewers tended to select respondents for their known drinking behavior.

There is further, more positive evidence of such selection. In the previous study it was argued that selection did *not* operate because the discrepancy among interviewers with smaller assignments was no greater than among those with larger assignments. In the present survey, however, the smaller the assignment the greater was the tendency for interviewers to report respondent drinking habits similar to their own. This tendency was only slightly more pronounced among abstaining than among drinking interviewers; and since the number of interviews by the groups of interviewers was approximately equal, their errors would tend to offset each other, thus reducing the net bias.

Although we have ruled out interviewer interpretation and influence up to an early point in the interview, these factors have not been eliminated as sources of error biasing the *prevalence rates*. Prevalence rates are based on a question which appears later in the interview, and the response to this question was recorded by the interviewer.

If interviewer influence should affect the prevalence rate we might expect the effect to be most pronounced in the case of respondents who have no strong commitment to the use or nonuse of beverage alcohol and who are therefore most susceptible to influence (7, *ch. 4*). Moreover, these persons are presumably light drinkers, and common sense suggests that they are therefore most likely to give an ambiguous answer to the drinking question, one that would be subject to interviewer interpretation. Many of these "marginal drinkers," and they constitute nearly one-half of the drinkers in our sample (2), may have had a drink some time ago and may be uncertain as to when they will partake again. They may respond negatively to one interviewer and positively to another, or they may phrase their answer in ambiguous terms.

To test this, prevalence rates were compared after simultaneously controlling for interviewer drinking habits and for respondents' total scores on the attitudinal items. It was found that among respondents with only moderately negative definitions of alcohol—i.e., those who checked either 1 or 2 of the 4 negative attitudinal statements—drinking interviewers reported a prevalence rate of 74 per cent, and abstaining interviewers a rate of only 62 per cent. On the other hand, among respondents with stronger definitions of alcohol—i.e., those who either accepted none of the four negative items, or accepted at least three of them—the prevalence rate was essentially the same, regardless of interviewer drinking habits. Similar analysis of the responses to the 21 positive items yielded additional supporting evidence.

Thus, as hypothesized, the discrepancy is confined to respondents with less extreme definitions of alcohol. This argues for some error in the interviewing situation. If people are more likely to understate than to overstate their drinking, especially when interviewed by an abstainer, then the resulting bias is in the direction of understatement of the prevalence rates.

In summary, this detailed examination of sampling methods and interviewer procedures revealed that drinking interviewers reported higher rates of drinkers than did abstaining interviewers. This factor could bias the prevalence rate by a maximum of approximately 8 percentage points, and might also bias the extent of drinking rates, but to a lesser degree.

Part of the discrepancy was attributed to interviewer selection of respondents for their drinking habits, but since this was a fault common to both drinking and abstaining interviewers, they tend to offset each other, thus reducing the net effect on both the prevalence and extent rates. Some of the discrepancy was traced to interviewer influence or interpretation of the responses of light drinkers who are relatively moderate in their attitudes toward alcohol. This effect was attributed mainly to abstaining interviewers and would deflate the prevalence rate by 2 percentage points. However, this may be offset by the less educated being underrepresented in the sample, which biases the prevalence rate by 2 percentage points in the opposite direction.

It is concluded that the net effect of the methodological errors that were detected is negligible and we may therefore more confidently accept the accuracy of the rates reported below, that is, we can expect them to be within the limits of normal sampling variability.

The Prevalence and Extent of Drinking

Measures and Mode of Analysis

The two dependent variables to be investigated are (1) the use or nonuse of alcoholic beverages and (2) the extent of drinking. Both are measured in the same manner as in the 1958 survey. The first is measured by asking respondents the standard Gallup Poll question.¹² Those who reported having occasion to use alcohol will be called "drinkers."

The extent of drinking is measured by the Quantity-Frequency (Q-F) Index.¹³ This index is based on the respondent's report of the number of drinks (converted to ounces of absolute alcohol) which he ordinarily consumes at one "sitting" (occasion), combined with the reported frequency of these sittings during the preceding year. The resulting five Q-F Index types are for present purposes combined into three classes of drinkers,

¹² "Do you ever have occasion to use alcoholic beverages such as liquor, wine or beer—or are you a total abstainer?"

¹³ This measure was originally developed by Straus and Bacon (8) and is described more fully elsewhere (2).

light, moderate and heavy. Whereas the rates of drinkers are based on the total sample, the extent of drinking percentages or rates are based on the number of drinkers only—abstainers are omitted.

The five independent sociocultural variables to be studied are *age*, *sex*, *residence*, *religion* and *education*. As in the previous work, the usual indicators of these are employed (1). However, the index of religious affiliation is not exactly comparable. As mentioned previously, in the replication a greater effort was made to obtain the respondent's specific denominational preference.

It is not feasible to compute significance of difference tests for the several hundred paired comparisons which will be made on the findings of the two studies and for the numerous associations between the dependent and independent variables. Instead, we shall employ a chart which shows the approximate difference between two proportions required to reject the null hypothesis at the .05 level of significance. Table 2 is representative of the more elaborate chart which was used.

RESULTS

Prevalence of Drinking

When the total prevalence rates and the rates of the major social segments revealed by the two surveys are compared (Table 3) only a few small differences are noted, none statistically significant.

Among the 91 minor social segments obtained by further cross-tabulations only 1 significant difference occurred: 56 per cent of the Methodist men were recorded as drinkers in 1958; in the 1961 replication, 71 per cent. This could be an artifact of the change in the religious-affiliation measure.

Table 3 shows that all the *total* associations between sociocultural factors and the prevalence of drinking remained in the second study. When each of the sociocultural factors was in turn held constant against another, none of these total associations disappeared completely.

TABLE 2.—*Approximate Differences Between Two Percentages Required to Reject a Null Hypothesis at the .05 Level of Significance (for a 2-Tail Test)*

Lower %	SIZE OF SAMPLE					
	25	50	100	250	500	1000
10		14.7	9.9	5.9	4.0	2.8
30	27.4	19.2	13.4	8.3	5.8	4.1
50	26.7	19.2	13.7	8.7	6.2	4.4
70	21.7	16.2	11.9	7.7	5.5	4.0
90		9.0	6.9	4.7	3.4	2.5

TABLE 3.—*Per Cent Who Drink in the Iowa Adult Population and in Selected Social Segments, 1961, Compared with 1958 Findings*

	N	% Drink	Diff.*
<i>Totals</i>	1209	59	0
<i>Sex</i>			
Male	574	67	-1
Female	633	52	+2
<i>Education</i>			
Grade school	314	45	-6
High school	669	64	+4
College	223	66	+3
<i>Residence</i>			
City	603	67	+1
Town	270	51	-4
Farm	334	49	0
<i>Age</i>			
21-25	94	65	-4
26-35	243	77	+5
36-45	282	66	+4
46-60	304	59	+2
61+	278	36	-1
<i>Religion†</i>			
Catholic	252	81	+2
Lutheran	228	62	+1
Methodist	271	55	+6
Other Protestant	437	48	-4

* Percentage points higher (+) or lower (-) than 1958 findings.

† Values of the religious categories are not exactly comparable in the two studies. See footnote 6.

Although only one of the prevalence rates—that of the Methodist men—differed significantly between the two studies, the degree and nature of the association in several of the partials did vary from the first to the second study owing to insignificant increases in some *p*'s and decreases in others.¹⁴ We can illustrate how the nature and degree of some of the partial associations differed between the two studies by noting differences in rates of drinkers by sex and residence when these are controlled against one another. In the first

¹⁴ It should be recalled that these partial associations were given a descriptive treatment only in the previous work—no statistical tests were carried out. Instead, all differences as large as 10 percentage points—and in some cases even smaller differences—were commented on briefly. More definitive studies of the exact nature of these numerous partial associations would require a larger number of cases in many of the social segments and the use of statistical tests.

study sex differences in rates of drinkers were greater among city residents than among farm residents; in the second study they were virtually the same size regardless of residence.

It is concluded that the estimated prevalence rates in the entire population and in the several major social categories shown in Table 3 are reliable, and that the existence and direction of the total associations between prevalence rates and the several socio-cultural factors studied are reliable. Although the exact degree and nature of the partial associations in the numerous "minor" social segments are uncertain they provide hypotheses worthy of further study.

Extent of Drinking

Table 4 shows that the distribution of the total 1961 sample by Q-F Index scores differs little from the 1958 distribution. The greatest difference is 3 percentage points. The pattern and direction of the differences, however, suggests that the extent of drinking is lower in the 1961 study. This is increasingly apparent in Table 5 and becomes even more obvious in the further cross-tabulations to be discussed.

Table 5 compares the rates of light and of heavy drinkers in the two studies in each of several major social segments. The rate of light drinkers in 1961 is significantly higher in the total sample and in the following major social segments: city dwellers, the age group 46-60, the grade-school and the high-school educated. The

TABLE 4.—*Drinkers in the Adult Population of Iowa Classified by Q-F Index Types, 1958 and 1961*

Q-F Index Type	1958		1961		Diff.
	N	%	N	%	
Light drinkers					
Type 1	255	22	302	25	+3
Type 2	54	5	72	6	+1
Moderate drinkers					
Type 3	179	15	180	15	0
Type 4	60	5	60	5	0
Heavy drinkers					
Type 5	105	9	76	6	-3
Undetermined*	52	4	20	2	-2
Abstainers	479	40	502	41	+1

* Drinkers but insufficient data for Q-F scoring.

TABLE 5.—*Per Cent of Light and Heavy Drinkers in Iowa and in Selected Social Segments, 1961 and 1958*

	N	% Light Drinkers	Diff.*	% Heavy Drinkers	Diff.*
Totals	690	54	+7†	11	-5†
Sex					
Male	374	44	+6	15	-7†
Female	315	66	+6	7	-1
Education					
Grade school	134	60	+16†	5	-11†
High school	413	55	+8†	12	-4
College	142	51	0	15	-2
Residence					
City	402	52	+10†	13	-5†
Town	132	58	+7	8	-8
Farm	155	58	+1	8	-3
Age					
21-25	59	63	+10	8	-7
26-35	184	55	+4	11	-4
36-45	184	50	+8	18	+1
46-60	147	64	+12†	7	-10†
61+	92	62	+10	2	-6
Religion‡					
Catholic	201	43	+5	13	-7
Lutheran	135	56	+8	7	-6
Methodist	141	65	+8	9	-7
Other Prot.	202	57	+5	12	+1

* Percentage points higher (+) or lower (-) than the 1958 findings.

† Significant ($p < .05$) difference.

‡ Values of religious categories are not exactly comparable in the two studies. See footnote 6.

rate of heavy drinkers is lower in the total sample and among men, the grade-school educated, city residents, and the age group 46-60.

Including both rates of light drinkers and rates of heavy drinkers, 146 paired comparisons were made among the minor social segments obtained by cross-tabulation. The proportions of light drinkers increased significantly among men living in the city, men aged 46-60, women with high-school education, city residents with high-school education, and city residents aged 36-45. Rates of heavy drinkers decreased among Lutheran men, men aged 46-60, men with grade-school education, and respondents aged 46 or more who had either a grade-school or high-school education or who were city residents. The greatest decline in extent of drinking was recorded among men

aged 46-60; their rate of light drinkers was 31 percentage points higher in the replication and their rate of heavy drinkers 19 percentage points lower.

It can be seen in Table 5 that all the sociocultural factors are associated with the extent of drinking. With the possible exception of education, these associations differ little from those found in the earlier study. Contrary to the 1958 findings (2), the 1961 data do suggest an association between education and extent of drinking, the grade-school educated reporting a lesser extent of drinking than do those with more years of schooling.

When each of the sociocultural factors was cross-tabulated with every other, the total association never disappeared completely. However, owing to the general decline in extent of drinking, the exact nature and degree of the association in the numerous partials, i.e., minor social segments, varied considerably from the 1958 findings. For example, in the first study, as the level of education increased, there was a slight increase of heavy drinkers among the men and a slight decrease among women. In the present study, the increase in rate of heavy drinkers with increased education is even greater among men; among women, however, no educational differences appeared in the replication. As in the case of prevalence rates, the associations between extent of drinking and the several social factors in the various minor social segments need to be tested more rigorously.

The apparent decline in the extent of drinking noted in the replication may have been due to (1) errors in sampling design and interviewer performance; (2) actual change in extent of drinking—either a permanent trend or a seasonal fluctuation; or (3) a lack of reliability in the Q-F Index.

Our earlier examination of sampling methods and interviewing procedures revealed no errors that would account for the decline. Furthermore, the apparent reliability of the prevalence rates gives added confidence in the general methodology of the study.

As to the question of a permanent change, there are no other indications, either in this study or from other sources, which lead us to expect such a decline during the 30-month interval between the two investigations. In fact, data on the sale of alcoholic beverages—especially beer—show a general upward trend in recent years (9). On the other hand, the sale of beer consistently shows a marked seasonal fluctuation, and herein lies the most reasonable

explanation of the observed decline in the extent of drinking. The sale of beer reaches a low point during the months of February and March and a peak during the summer. In Iowa approximately 35 per cent more beer is sold during the months of June and July than in February and March; in the nation the increase is 50 per cent.

In accounting for this, we may note first of all that our culture defines beer as a hot-weather beverage. However, there are probably crucial economic factors involved, at least for certain social segments. We may suppose that for the majority of drinkers beverage alcohol is a "luxury" item and that consumption varies directly with the amount of disposable income remaining after "necessities" are purchased (10). Expenditures for basic necessities such as fuel, clothing, food and even taxes are higher, and for many people—e.g., construction workers—disposable income is lower, in the mid-winter months. Furthermore, the lower and moderate income groups tend to be the greater beer consumers (8). We have seen earlier that most of the decline appeared among males, the high-school and grade-school educated, the oldest age groups, and city dwellers. With the exception of city dwellers each of these categories tends to be beer drinkers or to have relatively modest incomes, and therefore, if our reasoning has been correct, might be expected to drink less beer in the winter months. To explain why city dwellers also showed a more significant decline in extent of drinking than did farm and town residents will require further study.¹⁵

It is concluded that the observed decline in the extent of drinking reflects the sensitivity of the Q-F Index to the seasonal variation in alcohol consumption.¹⁶ Granting such seasonal fluctuations, it is reasonable to conclude that the findings regarding the extent of

¹⁵ The 1958 study revealed that 30 per cent of the men drinkers but only 21 per cent of the women drinkers preferred beer. Also, 42 per cent of the grade-school, 28 per cent of the high-school and 12 per cent of the college educated preferred beer. Although the oldest age group (46 years and over) reported no special preference for beer, their modest economic circumstances may leave them little choice. Likewise, city dwellers revealed no special preference for beer.

¹⁶ Here it should be noted that the Q-F Index was not designed to be thus sensitive. The frequency question specifically asks the respondent to generalize about his drinking *over the past year*, but the quantity question does not state a time period. Impressionistic evidence from conversations with subjects who have responded to these questions indicates that in spite of the question wording they generalize only over the previous couple of months. Research is needed to determine the question wording which would take control of the time factor from the respondent and give it to the experimenter.

drinking in the adult population of Iowa and in the major social segments studied are reliable. And it is also concluded that, with the possible exception of education, the total associations between extent of drinking and the several sociocultural factors investigated are reliable. The nature of the associations in the minor social segments cannot be ascertained, but they do provide hypotheses for study.

SUMMARY AND CONCLUSIONS

A replication study in 1961 has examined the methods and tested the reliability of the results of a 1958 survey of the prevalence and extent of drinking in the population of the State of Iowa and in several of its social segments. Data for the replication were gathered approximately 30 months after the original work and were obtained from interviews with 1,213 Iowans (574 men, 633 women) chosen to represent the adult population (aged 21 years and over).

Examination of the sampling design and interviewer performance revealed that the less educated appeared to be underrepresented in the sample, biasing the prevalence rate toward overstatement by 2 percentage points. Another source of bias was a tendency of interviewers to select respondents for their known drinking habits, and interviewer influence on, or interpretation of, the responses. The influence-interpretation error was attributed mainly to abstaining interviewers and biased the prevalence rate toward understatement by 2 percentage points. Since the selection error, which could have biased the prevalence rate a maximum of approximately 8 percentage points, was common to both abstaining and drinking interviewers, it tended to cancel out. It is concluded that the net effect of these methodological errors is negligible.

In the total Iowa sample, 59 per cent reported themselves as drinkers (males 67 and females 52 per cent); those with grade-school, high-school and college education, 45, 64 and 66 per cent, respectively; city, town and farm dwellers, 67, 51 and 49 per cent, respectively; Catholics, Lutherans, Methodists and other Protestants, 81, 62, 55 and 48 per cent, respectively; and by age, the respective percentages of drinkers in the classes 21-25, 26-35, 36-45, 46-60, and 61+ were 65, 77, 66, 59 and 36.

Comparisons of the prevalence rates in the two studies revealed no significant differences either in the total sample or in any of the major social segments, and in only one of the minor social segments.

The existence and the direction of the total association between rates of drinkers and the several sociocultural factors were stable. However, the exact nature and degree of some of the partial associations in the minor social segments did vary between the two studies, owing to minor shifts in rates which can be attributed to normal sampling variation.

The replication revealed a general decline in extent of drinking, as measured by the Quantity-Frequency Index. The decline reached statistical significance in the sample as a whole (7 per cent more light and 5 per cent fewer heavy drinkers); in 5 of the major social segments (16 per cent more light and 11 per cent fewer heavy drinkers among the grade-school educated, 8 per cent more light drinkers among the high-school educated; 10 per cent more light and 5 per cent fewer heavy drinkers among city dwellers; 12 per cent more light and 10 per cent fewer heavy drinkers in the age class 46-60; and 7 per cent fewer heavy drinkers among men); and in 10 of the minor social segments.

Except possibly in education, the total associations between the sociocultural factors and the extent of drinking remained stable in the second study despite the general decline in extent of drinking. However, as in the case of prevalence rates, many of the partial associations in the minor social segments did vary between the two studies.

It is concluded that the estimates of the prevalence of drinkers in Iowa and in the several social segments of the population, as well as the total associations between rates of drinkers and sociocultural factors, are reliable.

It is suggested that the decline in the extent of drinking might be due to seasonal fluctuations in the consumption of alcohol, especially of beer, since the replication study was carried out during the season of lowest beer consumption.

Finally, it is concluded, as in the 1958 study, that differences in drinking behavior are related to the identification of individuals with, and their membership in, the various social segments of the population. Why these factors produce variations in drinking remains to be explained.

REFERENCES

1. MULFORD, H. A. and MILLER, D. E. Drinking in Iowa. I. Sociocultural distribution of drinkers. With a methodological model for sampling evaluation and interpretation of findings. *Quart. J. Stud. Alc.* 20: 704-726, 1959.

2. MULFORD, H. A. and MILLER, D. E. Drinking in Iowa. *II*. The extent of drinking and selected sociocultural categories. *Quart. J. Stud. Alc.* **21**: 26-39, 1960.
3. U.S. DEPARTMENT OF COMMERCE, BUREAU OF THE CENSUS. Iowa Reports PC(1)17B, General Population Characteristics; and PC(A3)17, General Social and Economic Characteristics; 1960.
4. STEPHAN, F. and McCARTHY, P. *Sampling Opinion: An Analysis of Survey Procedures*. New York; Wiley; 1958.
5. CANTRIL, H., ed. *Public Opinion, 1935-1946*. Princeton, N. J.; Princeton University Press; 1951.
6. MULFORD, H. A. and MILLER, D. E. Drinking in Iowa. *III*. A scale of definitions of alcohol related to drinking behavior. *Quart. J. Stud. Alc.* **21**: 267-278, 1960.
7. MACCOBY, E. E., NEWCOMB, T. M. and HARTLEY, E. L. *Readings in Social Psychology*; ch. 4. New York; Holt; 1958.
8. STRAUS, R. and BACON, S. D. *Drinking in College*. New Haven; Yale University Press; 1953.
9. UNITED STATES BREWERS ASSOCIATION. *Brewers Almanac*, 1961.
10. SEELEY, J. R. Death by liver cirrhosis and the price of beverage alcohol. *Canad. med. Ass. J.* **83**: 1361-1366, 1960.

