Insights into dietary recall from a longitudinal study: accuracy over four decades1–3

Johanna T Dwyer and Kay A Coleman

ABSTRACT  We studied the validity and consistency of memory of foods consumed decades earlier in a longitudinal population of 91 persons. The memory of middle-aged persons for food intake years earlier did not decline invariably over time, although median correlations between actual and recalled consumption decreased. Time-related memory loss varied greatly from food to food. Neither analyses of group mean differences and SDs over all foods nor those for individual foods provided clear-cut evidence of time-related memory loss. Systematic biases in memories of dietary intakes in the distant past were evident, depending on current diet and varying according to individual foods and food groups. These discrepancies may represent either misremembering or the effects of inferential processes. Examination of the consistency (reliability) and validity of reports of food intake indicated that validity estimates provided by mean differences between recalled and actual intakes were more revealing than correlation coefficients. Consistent reports were not necessarily valid, as indicated by memories of food intake. Correct inferences may have been made even when the actual memory was lost. Am J Clin Nutr 1997;65(suppl):1153S–8S.

KEY WORDS  Dietary recall, remote memory, validity, reliability, longitudinal study, middle-aged adults, food intake, bias

INTRODUCTION

Studies of dietary assessment methods may help investigators find better ways to ask questions in surveys, recognize biases, improve accuracy, and decrease or control for error in estimates of intakes (1). They may also provide insights into underlying cognitive processes that can improve the accuracy of recall. This paper describes some of our recent studies on validity, consistency, and the reliability of memory for diet in a longitudinal study population. We were particularly interested in three principal questions.

Does memory for food intake decline invariably with time?

Retrospective reports of dietary intakes are commonly used in case-control and other epidemiologic investigations. It is usually assumed that memory for information acquired long ago is less accurate than that for more recent information. Yet the validity of recall for habitual diet long ago is difficult to study because only rarely are verifiable data on earlier intakes available. For the studies described here, however, we had access to records of food intakes in the distant past with which we could compare recalls.

Are memories of dietary intakes systematically biased?

The problem of defining intakes that are potentially harmful is complicated by unidentified, systematic reporting bias and random error in estimates of intakes. Systematic bias is of concern, particularly when it is related to the outcome under study. Certain people have biases when reporting intakes; for example, some obese persons often underreport their dietary intakes (2). Sometimes biases can be identified and taken into account. However, when systematic biases that are associated with the outcome under study exist, but the characteristics associated with them cannot be identified, the biases increase the risk of misclassification, particularly if it is assumed that absolute and reported intake amounts are equivalent (3). Therefore, we examined our data for evidence of systematic bias.

Is the consistency (reliability) of the memory of food intake equivalent to the validity of a report and ultimately the quality of the food memory?

A consistent report may be valid, and consistency is essential for validity. Reliability sets the upper limit on validity; thus, the consistency (or precision) of a report of food intake is an important determinant of its validity. Consistency, however, is often incorrectly assumed to be evidence of validity. In epidemiologic investigations that deal with dietary analysis, the relative accuracy of reports of intakes, as assessed with use of correlation coefficients, has been studied extensively, whereas the validity (that is, actual accuracy) of memories of food intake in the distant past has rarely been addressed (4). We examined the validity of the reports of diet in our longitudinal population.

1 From the Departments of Medicine and Community Health, Tufts University Medical School, Boston; the Jean Mayer Human Nutrition Research Center on Aging at Tufts University, Boston; the Frances Stern Nutrition Center, New England Medical Center, Boston; and the Department of Psychology, Boston University, Boston.

2 Funded in part by the US Department of Agriculture, Agricultural Research Service (contract 53 3K06 01). The contents of this publication do not necessarily reflect the views or policies of the US Department of Agriculture, nor does the mention of trade names, commercial products, or organizations imply endorsement by the US government.

3 Address reprint requests to J Dwyer, Box 783, New England Medical Center, 750 Washington Street, Boston, MA 02111. E-mail: johanna.dwyer@es.nemc.org.
METHODS

Longitudinal database

The examples used to illustrate the principles examined in this study were derived from the Longitudinal Studies of Growth and Development at the Harvard School of Public Health, Boston (5). The 91 participants were members of a group of subjects whose mothers had enrolled them prenatally in the Longitudinal Study of Child Health and Development at the Harvard School of Public Health in the 1930s and who were followed from birth.

Food recall

Current data were collected from subjects whose mean age was 55 y, and reported memories were obtained for their consumption at the ages of 5–7, 18, 30, and 55 y. Data collection was done with a semiquantitative food-frequency questionnaire designed for the study and administered by an interviewer. Additional details about the methods and analysis used in this study are provided elsewhere (6, 7).

Analysis of data

Data were analyzed with respect to previous consumption of individual foods and food groups. The food groups were constructed to be consistent with the items on the interview form for ages 5–7 y to allow comparisons across all time intervals and were similar to those used in the second National Health and Nutrition Examination Survey (8). Mean differences between reports based on memory and the historical record were examined, as were the results of regression analysis of current consumption, recalled intake, and the historical record. In each regression model for a particular food group, the historical consumption at 30 y was the dependent variable, and recalled consumption for age 30 y and current intake (age 55 y) were the independent variables.

RESULTS

Time- and age-related memory loss

The median correlations between actual and reported consumption for all foods asked about declined with longer time intervals and for earlier ages, from \( r = 0.24 \) for 30 y to 0.12 for 18 and 5–7 y. Thus, on average, time- and age-related memory loss was less for recalls at the age of 30 y than for younger ages, which were longer ago (6).

However, additional analysis of recalls of some individual foods (representative of different commonly eaten items) showed that reports from childhood were not necessarily less valid than those obtained in adulthood (Table 1). Time-related memory loss varied greatly from food to food and depended on the type of analysis used. The mean difference between the actual and recalled frequency of consumption of specific foods and the SDs of those differences yielded two different perspectives. The mean difference provides an assessment of accuracy for the group but not individual accuracy. Individuals in the group may vary considerably in accuracy, with some greatly overestimating past consumption and others markedly underestimating it. If individuals within the group systematically overestimated consumption, the group mean would reflect that bias and deviate positively from zero, whereas if the subjects underreported consumption, the group mean would be negative. If actual and recalled food consumption reported by each participant were the same, both the mean difference for the food and its SD would be zero.

As shown in Table 1, there were differences between actual and recalled consumption at three ages in our study. For group estimates, as measured by mean differences, some foods were remembered accurately from childhood, whereas others were remembered less accurately from age 18 y. The amount of bread consumed at age 18 y was greatly underestimated systematically. With respect to individual accuracy, the SDs varied widely for each age. For some foods, such as rice, individual reports were accurate at all three ages. Many factors affect the accuracy of these group and individual intakes. Although it may appear that frequency of consumption is the strongest factor, in fact, it is probably the pattern of consumption and not a simple “quantity” factor that affects accuracy. Foods rarely eaten and those eaten every day may be reported accurately. For example, group and individual consumption of potatoes was reported fairly accurately. On the other hand, individual estimates of butter and bread consumption were inaccurate at all ages.

<table>
<thead>
<tr>
<th>TABLE 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual consumption compared with recalled consumption of portions of foods per week reported in middle age as having been eaten previously at three different ages</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food</th>
<th>5–7 y</th>
<th>Difference</th>
<th>18 y</th>
<th>Difference</th>
<th>30 y</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ice cream</td>
<td>−0.02</td>
<td>−0.6 ± 2.0</td>
<td>0.39</td>
<td>−2.1 ± 3.3</td>
<td>0.35</td>
<td>−0.2 ± 1.9</td>
</tr>
<tr>
<td>Eggs</td>
<td>0.20</td>
<td>−1.7 ± 4.5</td>
<td>0.29</td>
<td>−0.9 ± 6.5</td>
<td>0.30</td>
<td>0 ± 0.8</td>
</tr>
<tr>
<td>Cereal</td>
<td>0.07</td>
<td>3.3 ± 2.2</td>
<td>0.33</td>
<td>1.5 ± 7.8</td>
<td>0.36</td>
<td>0.5 ± 2.3</td>
</tr>
<tr>
<td>Bread</td>
<td>−0.02</td>
<td>−3.9 ± 14.3</td>
<td>0.07</td>
<td>−22.8 ± 23.2</td>
<td>0.36</td>
<td>−5.2 ± 10.1</td>
</tr>
<tr>
<td>Citrus</td>
<td>0.11</td>
<td>−1.1 ± 7.2</td>
<td>0.73</td>
<td>−1.7 ± 3.9</td>
<td>0.43</td>
<td>−0.5 ± 3.5</td>
</tr>
<tr>
<td>Potato</td>
<td>0.33</td>
<td>−1.4 ± 4.1</td>
<td>0.13</td>
<td>1.3 ± 9.0</td>
<td>0.14</td>
<td>0.3 ± 1.5</td>
</tr>
<tr>
<td>Rice</td>
<td>0.13</td>
<td>−0.2 ± 1.2</td>
<td>0.36</td>
<td>0.1 ± 0.6</td>
<td>0.59</td>
<td>0.4 ± 1.1</td>
</tr>
<tr>
<td>Butter</td>
<td>−0.04</td>
<td>−15.0 ± 14.3</td>
<td>0.24</td>
<td>−13.1 ± 19.1</td>
<td>0.16</td>
<td>−5.9 ± 15.9</td>
</tr>
<tr>
<td>Chocolate</td>
<td>−0.16</td>
<td>−1.2 ± 3.1</td>
<td>0.06</td>
<td>0.8 ± 3.2</td>
<td>0.36</td>
<td>0.3 ± 1.7</td>
</tr>
<tr>
<td>Coffee</td>
<td>0.70</td>
<td>0.1 ± 0.8</td>
<td>0.48</td>
<td>3.6 ± 14.3</td>
<td>0.14</td>
<td>9.2 ± 25.7</td>
</tr>
</tbody>
</table>

\(^1\) \( t \) ± SD; \( n \) in brackets (the number of persons who actually answered each item).

\(^2, 4\) Recall value minus actual value significantly different from zero: \(^2\) \( P < 0.01, ^4\) \( P < 0.001, ^4\) \( P < 0.05.\)
The data did not show a clear decline in accuracy of reports over time. Some reports of childhood and adolescent intakes appeared to be more accurate than reports of consumption in adulthood. In addition, when recalls of food intakes in these same subjects were compared with recalls of other types of autobiographical information, such as weight, variability in recall according to age and time interval was inconsistent and depended on the type of information being recalled (data not shown). Thus, it cannot be assumed that the longer the time interval between consumption and report, the less accurate the report.

Systematic bias in reported intakes

To address the questions of whether estimates of dietary intakes are systematically biased and whether reports of current consumption are useful in controlling for any bias, we first performed standard correlational analyses to examine the interrelation of current consumption, historical consumption, and memory for past consumption (6). The correlation between current frequency of consumption and past consumption provides a measure of the stability of dietary habits, i.e., the relation between foods eaten now and those eaten in the past. Our data suggested that diet was unstable over time: the subjects did not eat the same foods at 55 y that they had eaten at 30 y. Current diet, therefore, was not a good surrogate for dietary intake at an earlier age. With respect to the accuracy of reports of previous consumption, the correlations between recalled and historical consumption were significant, although small, for most food groups. Of all three correlations, that between recalled and current consumption—representing the relation between food groups currently eaten and reported memories of what was eaten in the past—was usually the highest. These findings are shown in Table 2. Perception of past diet was affected by current intake.

Other questions, however, arose from these data. For example, which report more accurately reflects remote intake: current diet or recall of diet in the remote past? Table 2 shows the results of regression analyses in which reports of foods consumed earlier (at age 30 y) were compared with the historical records and evaluated according to current consumption. The criterion variable was actual consumption obtained from the historical record for various food groups, and the first predictor variable was the report at age 55 y of what was remembered as having been eaten at age 30 y. The second predictor variable was current consumption. The results indicated clearly that recalled intake more accurately predicted historical intake than did current consumption. Even though current consumption was correlated with memory for what was consumed earlier because it was correlated with another predictor variable (reported consumption), it did little to improve the accuracy of estimates of earlier diet in the model.

Accuracy of diet reports

Table 1 shows mean differences and SDs between the number of portions per week that were remembered as having been eaten and the actual number in the historical record. This analysis provides a different perspective on the question of whether reported food intakes are equivalent to the validity of the report in an absolute sense. For example, for consumption of cereal at age 30 y, group accuracy was good, with the mean difference being less than one portion per week (0.5). Bread consumption at the same age, however, was underestimated significantly by the group (mean difference: −5.2) and individual accuracy varied greatly (SD: −10.1). The patterns of accuracy for these two foods were therefore different, yet the correlations between reported and actual consumption for both were r = 0.36. Thus, correlation coefficients, although useful for predicting relative amounts eaten, provide little information about actual levels of consumption or bias in reporting of intake. For such purposes, significance is not meaningful.

Statistics other than correlations, such as the mean differences between two estimates obtained by different methods, provide different perspectives. The SDs of these means give good estimates of individual accuracy. Comparisons with a criterion, such as the percentage of subjects in some category (eg, 5% of actual estimates) would provide an additional descriptive measure.

### Table 2

Regression analyses and correlation coefficients from bivariate analyses (rightmost three columns) of recalled and current food consumption (number of portions per week) reported by middle-aged subjects and used to predict historical consumption 25 y earlier in a longitudinal study population

<table>
<thead>
<tr>
<th>Food group</th>
<th>Food items on questionnaire</th>
<th>Intercept</th>
<th>Recall β</th>
<th>Current β</th>
<th>R²</th>
<th>r: Recall versus (actual) historical</th>
<th>r: Current versus historical</th>
<th>r: Recall versus current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>3</td>
<td>2.0</td>
<td>0.5</td>
<td>−0.1</td>
<td>63</td>
<td>0.8</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Citrus</td>
<td>4</td>
<td>3.3</td>
<td>0.6</td>
<td>−0.2</td>
<td>22</td>
<td>0.4</td>
<td>0.1</td>
<td>0.3</td>
</tr>
<tr>
<td>Dairy</td>
<td>7</td>
<td>11.4</td>
<td>0.4</td>
<td>0.03</td>
<td>19</td>
<td>0.5</td>
<td>0.3</td>
<td>0.5</td>
</tr>
<tr>
<td>Potato</td>
<td>3</td>
<td>2.2</td>
<td>0.3</td>
<td>0.3</td>
<td>18</td>
<td>0.3</td>
<td>0.4</td>
<td>0.5</td>
</tr>
<tr>
<td>Coffee</td>
<td>1</td>
<td>14.9</td>
<td>0.2</td>
<td>0.2</td>
<td>16</td>
<td>0.1</td>
<td>0.4</td>
<td>0.4</td>
</tr>
<tr>
<td>Grains</td>
<td>5</td>
<td>11.7</td>
<td>0.2</td>
<td>0.3</td>
<td>14</td>
<td>0.3</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Dessert</td>
<td>3</td>
<td>7.6</td>
<td>0.5</td>
<td>0.03</td>
<td>12</td>
<td>0.4</td>
<td>0.2</td>
<td>0.6</td>
</tr>
<tr>
<td>Meat</td>
<td>4</td>
<td>4.6</td>
<td>0.3</td>
<td>−0.03</td>
<td>9</td>
<td>0.2</td>
<td>0.3</td>
<td>0.4</td>
</tr>
<tr>
<td>Eggs</td>
<td>1</td>
<td>1.8</td>
<td>0.5</td>
<td>−0.08</td>
<td>9</td>
<td>0.3</td>
<td>0.2</td>
<td>0.5</td>
</tr>
<tr>
<td>Poultry</td>
<td>1</td>
<td>0.7</td>
<td>0.2</td>
<td>0.05</td>
<td>9</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Fish</td>
<td>2</td>
<td>1.0</td>
<td>0.2</td>
<td>−0.04</td>
<td>6</td>
<td>0.2</td>
<td>0</td>
<td>0.3</td>
</tr>
</tbody>
</table>

1 From reference 6.
2 4 Significantly different: 2 p < 0.001, 4 p < 0.05, 6 p < 0.01.
3 Included in meat.
False memory for foods

We observed false memories for food, in that subjects currently eating large amounts of a certain food generally recalled having done so in the past, regardless of whether they actually did. The distorting effect of current diet on recall of past food consumption was revealed when the data were coded as errors of commission, or a false memory (reporting past consumption of a food item when it was in fact not eaten), and errors of omission (forgetting to report past consumption of an item that actually was eaten). Foods currently eaten were almost always reported as having also been eaten at age 30 y. Thus, for foods actually eaten both at 30 y and currently, there were few errors in memory; an average of only 3% of respondents made errors of omission when recalling foods eaten at age 30 y. In contrast, for foods eaten currently that had never been consumed in the past, 91% of the respondents made errors of commission. With respect to food at least, the past appears to be remembered in terms of current preferences and behaviors. The median recall-error rates and CIs for foods not currently eaten were similar regardless of whether the foods were actually eaten at age 30 y, although the findings were difficult to interpret because there were only a few foods that most of the participants had avoided completely.

DISCUSSION

Memory processes

Recall of food and dietary intakes is complicated (9). Many processes are involved in remembering food intakes over a long time. Characteristics of foods and what they mean to the individual (eg, a healthy or an unhealthy food or a socially approved or disapproved food) are involved. A salient memory of a particular food, meal, or dietary supplement with special characteristics (such as cod liver oil) may be recalled especially well. The amount of food consumed or the patterns of consumption may affect how people remember and report past consumption. The process of remembering having eaten a rarely consumed food (eg, caviar) is different from that of remembering eating a frequently consumed food. For a commonly eaten food, the memory of each time it was eaten is not retrievable; thus, inferences are made about the amount and frequency of consumption. Similarly, the process of reporting consumption of food eaten periodically (eg, fish every Friday) involves a generic event memory of a series of highly similar events (Friday-night fish dinners) (10), not a memory of each time the food was consumed. As part of this inferential process, people may be remembering their intake relative to some normative group. Our previously obtained data on memory for developmental landmarks (such as childhood weight, height, or age at menarche relative to peers) support this idea (11).

Individuals may also be able to rank themselves, relatively speaking, on the basis of their intakes. It is possible that when people’s memories are poor or they are asked for a level of detail they cannot provide, they make inferences, and those estimates are, on average, accurate (12). Our findings on the correlations between current and historical consumption suggest that subjects use current consumption patterns to aid them in making these inferences. It may simply be asking too much of them to provide information on how much they ate (unless they have visual aids or other memory assists). When they are unable to provide an answer but want to make a reasonable estimate or plausible guess, subjects may use information at hand (eg, their current eating habits) as the basis for their response.

Recent studies in other fields have identified several factors involved in forgetting, including loss of response altogether, forgetting of stimulus attributes (or loss of ability to discriminate among events (13)), distortion (14), and impaired source monitoring.

As was apparent from our data, the occurrence of false-positive memories over time is common; the phenomenon has been well documented in experimental settings (14–16). Stimuli become increasingly interchangeable. The longer the interval between events and misinformation, the more easily misinformation is injected into the original memory, with false information being incorporated as veridical, thereby distorting the original memory (14, 17).

It is likely that, after a long time, a combination of valid information and reconstructed information is what is remembered. Support for the existence of systematic reconstruction of memory, particularly false-positive memories, was provided by our study, because subjects who currently ate a certain food reported that they had eaten it in the past, even when they had not. We could not determine the extent to which this finding reflected reconstruction, conformity to perceived social expectations, inferential processes, an attempt to provide a plausible response (17), or a combination of these factors.

Another factor affecting the accuracy of retrieved memories involves impairments in reality monitoring, especially monitoring of information about sources (18). However, the effect may also be due to aging (19). In our study group, the age of the memory and the age of the subject varied together, so identifying the effect of each was not possible. It is known that many factors affect the ability to retrieve and report past food consumption accurately. A more elaborate view of remembering and forgetting, incorporating such factors as loss of information, misremembering, and inference, is needed in examinations of reports of dietary intake.

Time-related memory loss

People commonly think that when an event such as an eating occasion occurs, the memory of that event is recorded like a snapshot and stored in the brain. Then, over time, the memory fades in a linear fashion. If this view was correct, a gradual decline in the memory for foods eaten that was roughly proportional to the time since the event would have been observed in our study. Instead, we found that although there was some evidence that median correlations for all foods decreased, there was not a consistent decline over time for individual foods. Invariable memory losses over time for weight, growth, or size variables also did not occur in these subjects (11). Recent studies of autobiographical memory have suggested that memories are not “snapshots” of events recorded so much as schematic narratives that are encoded for later reconstruction rather than reproduction. This seems to involve fewer details being remembered, or only parts of events being recalled, with this reconstruction dimming in memory of some event components so that they are less vivid (no longer like a snapshot). Predicting which details will fade for an individual is difficult. The red wine spilling at last year’s convention dinner will soon become
dim in the memory of some observers but will remain a vivid picture for others.

In addition, over time, people may become more uncertain about their memories and less confident about recalling them, even though self-reported certainty and confidence are not necessarily indicators of accuracy. Individuals may not be able to recall an eating episode but may still recognize a food or meal pattern if it is presented on a list. Although our data set did not permit further exploration of these questions, it did show that accuracy of food-related memory did not decline invariably over time. Evidence of age-related declines in performance on some memory tasks has been found (19), but we observed that current reports or reports of recent events are not necessarily more accurate than reports from years earlier and that some reports from childhood can be accurate.

Bias in reported intakes

In this study, memories for food intake varied according to current diet and food. We and other researchers have found that current diet is associated with recalls of how frequently foods were consumed in the past, as well as whether they were consumed at all in an earlier time. In some instances, current diet was linked to recall of foods that had never been consumed or consumption frequencies far in excess of actual intake (20–24). This may be an example of new memories obliterating old ones (25). Whether they were crowded out, “written over,” or reconstructed, or whether the inaccurate recall simply represented attempts by our subjects to make an inference when the memory was not retrievable is not clear.

Accuracy of dietary reports

The principal issue addressed in this study was whether the reported levels of consumption provided a good assessment of absolute levels of consumption and, ultimately, the quality of the memory. People make inferences about past consumption (12), and these may be correct even when the actual memory has been lost. In addition, reports based on these inferences may be useful for prediction, even if they are not accurate in an absolute sense. What is really recalled or reported may be far from the truth, but it may still be useful in predicting a health consequence if the response is consistent and it correlates with that health effect.

With respect to food consumption, a high correlation between reported and actual intake indicates only that respondents’ reports of high frequency or amounts of previous consumption are relatively higher than those of others in the cohort. It does not mean that the amount they reported is correct. Everyone in the cohort may be overreporting (or underreporting) systematically.

If the goal of a study is to show that groups with lower previous intakes are more likely to have a disease or die than groups with higher intakes, the correlation coefficient between the intakes and the adverse event may be a satisfactory statistic for providing this estimate of relative accuracy, and other descriptors are not necessary. In one recent review of examinations of reports of past diet (4), it was noted that the correlation coefficient was used as the measure (although not necessarily the only measure) of accuracy of previous food consumption in 17 studies that examined either relative validity or reliability of retrospective dietary reporting.

We examined the use of several different statistics in the populations we studied to explore the issue of accuracy of reported food intakes. For purposes such as determining actual (as compared with relative) group or individual intakes that are likely to be associated with harmful events, the correlation coefficient is insufficient. When reported intakes are used in predicting a health consequence, however, the correlation coefficient may be useful. On the other hand, assuming that reported amounts of intake are accurate, even if they are predictably associated with a health consequence, is inappropriate and erroneous. Examples include the protein intakes that are most likely to be associated with progression of renal disease in groups or individuals with chronic renal failure (26) and the amounts of dietary fat or alcohol that may be associated with subsequent increased risks of certain cancers. Therefore, although correlational data may provide a good basis for predicting outcomes, the reports may not necessarily be accurate—they may simply be consistent.

False memory

Both errors of commission and errors of omission were common in our longitudinal population and depended partly on current diet. Variations according to type of food and frequency of food consumption may also exist.

Errors in recall of food-related and other events include but are not limited to the conventional view of false memory. Such errors are far more complex than fading memory or forgetting of events over time. They include errors of commission (false-positive memories) and errors of omission (false-negative memories). Distortions of quantity or frequency were common in the memories of our subjects.

We have reported elsewhere (27) on false memories, or misrepresenting, in both food-frequency questionnaires and food diaries in short-term recall situations. False memories may be present with several types of dietary assessment methods, specifically semiquantitative food-frequency questionnaires, food records, and 24-h recalls. Recalls of food frequency may be particularly subject to errors of omission and commission because the brain has no automatic counter for recording estimates of consumption of particular foods. False memories, although not always as frequent as errors of omission, are also common in reports of food intake.

Summary

We considered several factors in the assessment of the reliability and validity of dietary reports. We discriminated between consistency (reliability) and validity (accuracy) and showed that although reliability data are frequently used as estimates of accuracy, such data really provide information about only relative consumption. They may be useful in predicting a disease outcome, but they provide no basis for determining absolute levels of consumption. Data such as measures of mean differences provide estimates of accuracy for the group and any systematic biases inherent in group reports. In analyses of individual accuracy, the SDs of mean differences indicate such variability. Mean differences for the group may be accurate, even if individuals in that group have responded with great inaccuracy. If individual accuracy is important, SDs or the percentage of subjects responding within a certain criterion are valuable measures to use.
Our analysis indicated that accuracy of memory of foods consumed does not necessarily decline over time. Some reports from decades ago are at least as good as more recent memories. There appears to be some systematic bias in reporting. Foods eaten at present may affect reports of foods eaten in the past. In addition, reports of past consumption are not affected simply by forgetting. Memories of past consumption may be distorted and foods not consumed may be remembered as having been eaten; in other words, false memories exist. Finally, attention to factors such as forgetting of stimulus attributes, source memory, and inference may help in understanding the processes used in remembering and reporting previous dietary intakes.

We thank Isabelle Valadian, Jane Gardner, Elizabeth Kral, and Virginia Casey for their assistance in collecting and analyzing data over the years and Jean Hankin for her review of the manuscript.

REFERENCES


