after 1983 are 2.5% copper and 97.5% zinc, which explains the large gap between the lightest pennies and the heaviest pennies in Table 2-8.

Table 2-8 Randomly Selected Pennies

Weight (grams) of Penny	Frequency
2.40–2.49	18
2.50–2.59	19
2.60–2.69	0
2.70–2.79	0
2.80–2.89	0
2.90–2.99	2
3.00–3.09	25
3.10–3.19	8

Gaps Example 4 illustrates this principle:

The presence of gaps can suggest that the data are from two or more different populations.

The converse of this principle is not true, because data from different populations do not necessarily result in gaps.

Example 5 Comparing IQ Scores of the Low Lead Group and the High Lead Group

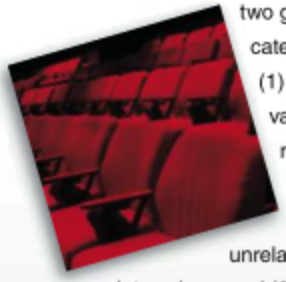
Table 2-1, which is given with the Chapter Problem at the beginning of this chapter, lists IQ scores from the low lead group and the high lead group. Because the sample sizes of 78 and 21 are so different, a comparison of frequency distributions is not easy, but Table 2-9 shows the relative frequency distributions for those two groups. By comparing those relative frequencies, we see that the majority of children in the low lead group had IQ scores of 90 or higher, but the majority of children in the high lead group had IQ scores below 90. This suggests that perhaps high lead exposure has a detrimental effect on IQ scores.

Table 2-9 IQ Scores from the Low Lead Group and the High Lead Group

IQ Score	Low Lead Group	High Lead Group
50–69	2.6%	
70–89	42.3%	71.4%
90–109	44.9%	28.6%
110–129	9.0%	
130–149	1.3%	

Missing Data

Samples are commonly missing some data. Missing data fall into



two general categories: (1) missing values that result from random causes unrelated to the data values, and (2) missing values resulting from causes that are not random. Random causes include factors such as the incorrect entry of sample values or lost survey results. Such missing values can often be ignored because they do not systematically hide some characteristic that might significantly affect results. It's trickier to deal with values missing because of factors that are not random. For example, results of an income analysis might be seriously flawed if people with very high incomes refuse to provide those values because they fear income tax audits. Those missing high incomes should not be ignored, and further research would be needed to identify them.