

13.2 THE MISUSE OF STATISTICS

Mathematical Concepts

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Statistics, when used properly, is a valuable tool to society. Many individuals, businesses and advertising firms misuse statistics to their own advantage.

We learn how to examine statistical statements before accepting them as fact.

Questions to ask yourself:

- ▶ was the sample used to gather the statistical data unbiased and of sufficient size?
- ▶ is the statistical statement ambiguous; i.e. can it be interpreted in more than one way?

Consider the advertisement.

"Four out of five dentists recommend sugarless gum for their patients who chew gum."

Note that we do not know

- ▶ the sample size
- ▶ the number of times the experiment was performed to obtain the desired results

In a golf ball commercial

a "type A" ball is hit and a second ball is hit in the same manner.
The type A ball travels farther.

Conclusion (supposedly): the type A is the better ball.

Questions

- ▶ how many times was the experiment previously performed?
- ▶ what are the results of previous experiments

Sources of bias:

- ▶ the wind speed and direction
- ▶ no two swings are the same!
- ▶ the ball may land on a rough or smooth surface

vague or ambiguous words lead statistical misuses and misinterpretations

- ▶ average : at least four different types
- ▶ largest: in what sense?