

38. A Morgan Stanley Consumer Research Survey sampled men and women and asked each whether they preferred to drink plain bottled water or a sports drink such as Gatorade or Propel Fitness water (*The Atlanta Journal-Constitution*, December 28, 2005). Suppose 200 men and 200 women participated in the study, and 280 reported they preferred plain bottled water. Of the group preferring a sports drink, 80 were men and 40 were women.

Let

M = the event the consumer is a man

W = the event the consumer is a woman

B = the event the consumer preferred plain bottled water

S = the event the consumer preferred sports drink

- What is the probability a person in the study preferred plain bottled water?
- What is the probability a person in the study preferred a sports drink?
- What are the conditional probabilities $P(M | S)$ and $P(W | S)$?
- What are the joint probabilities $P(M \cap S)$ and $P(W \cap S)$?
- Given a consumer is a man, what is the probability he will prefer a sports drink?
- Given a consumer is a woman, what is the probability she will prefer a sports drink?
- Is preference for a sports drink independent of whether the consumer is a man or a woman? Explain using probability information.