Probability

3.5   Conditional Probability

1. A paper published in 2008 looked at ethnic, gender, and acculturation influences on sexual behaviors. A total of 1,348 undergraduate students (429 men, 919women) at a large, public Southwestern university participated in this study for course credit in an introductory psychology course. The sample was composed of 67% Euro-American, 17% Hispanic, and 16% Asian participants. Participants ranged from 18 to 42 years old with a mean age of 19.03 for men (range, 18–32) and 18.79 for women (range, 18–42). As part of the study, men and women were asked, ''with how many partners have you had sexual intercourse, or oral sex, in your lifetime?'' The results for women are included below:

Number of lifetime sexual partners	Women			
	Euro-American	Hispanic	Asian	**Totals**
0	92	23	55	170
1	111	31	36	178
2 – 5	253	66	44	363
6 – 10	111	19	9	139
More than 10	49	17	3	69
Totals	616	156	147	919

   If one undergraduate female student is to be randomly selected from the student body of the university where this study was conducted, what is the probability that the person has had more than 10 partners given that they are Euro-American?

2. Use the same table of data given above to estimate the probability that a randomly chosen woman from the university is Asian, given that they are a virgin.

3. The following table includes the numbers of insured and uninsured Americans by race according to the U.S. Census 2008 Annual Social and Economic Supplement. Use the data to determine the probability that a randomly selected American is Hispanic given that he/she is uninsured.

In '000s	Race			
	White	Hispanic	Black	**Totals**
Insured	193,333	19,001	26,961	239,295
Uninsured	20,548	14,770	7,372	42,690
Totals	213,881	33,771	34,333	281,985

Answers:

1. $P(>10 \mid EA) = \dfrac{49}{616} \approx 0.0795$

    If you meet a European-American girl on that campus there is a 7.95% chance she has had more than ten partners.

2. $P(A \mid V) = \dfrac{55}{170} \approx 0.324$

    If you randomly selected a file indicating a study participant was a virgin, there would be a 32.4% probability that girl was Asian.

3. $P(H \mid U) = \dfrac{14,770}{42,690} \approx 0.346$

    A randomly selected uninsured person in the US has a 34.6% chance of being Hispanic.