

SOC 500 Precept 1: Bayes' Rule

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1 Translation into Probability Statements

- **M**: woman is murdered
- **A**: woman has previously experienced abuse
- **G**: woman's husband is guilty

Table 1: What Do We Know?

Statements	What we know	What we also know
1 in 1000 women who experience spousal abuse are subsequently murdered	$P(\text{ } \text{ }) = 0.001$	$P(\text{ } \text{ }) = 1 - 0.001$
half of men who murder their wives previously abused them	$P(\text{ } \text{ }) = 0.5$	$P(\text{ } \text{ }) = 1 - 0.5$
20% of murdered women were killed by their husbands	$P(\text{ } \text{ }) = 0.2$	$P(\text{ } \text{ }) = 1 - 0.2$
woman is murdered and the husband is not guilty, then there is only a 10% chance that the husband abused her	$P(\text{ } \text{ }) = 0.1$	$P(\text{ } \text{ }) = 1 - 0.1$

2 Application of Bayes' Rule

What we want to know: $P(\text{ } | \text{ }) =$

3 Key Takeaways

- When to use Bayes' Rule: often we have information about $P(B | A)$, but want to know $P(A | B)$ instead
- Translate into probability statements: $P(\text{"characteristics"} | \text{"among"})$