UKURAN ASOSIASI

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PENDAHULUAN

- Bagaimana menilai hubungan antar variabel dengan menggunakan metode analisis bivariat
- Analisis univarit sangat jarang terjadi di dunia nyata
- Terkadang ingin diketahui seberapa kuat hubungan antara :
  - Biaya iklan dan penjualan produk,
  - Suku bunga dan harga saham,
  - Upah dan kepuasan karyawan, dan masih banyak lainnya

SKALA DATA DAN UKURAN ASOSIASI

Skala Data		NOMINAL	ORDINAL	METRIC
NOMINAL	DIKOTOMUS	Phi; Cramer's V	Biserial rank Correlation; Cramer's V	Point-biserial r; classification of metric variables and application of Cramer's V
	NON-DIKOTOMUS	Cramer's V; Contingency coefficient	Cramer's V; Contingency coefficient	Classification of metric variables and application of Cramer's V
ORDINAL			Spearman's rho (ρ); Kendall's tau (τ)	Ranking of metric variables and application of ρ or τ
METRIC				Pearson's correlation (r)

ASOSIASI ANTARA 2 VARIABEL NOMINAL

- Tabel Kontingensi

		Gender		
		Female	Male	Total
Purchase	No Purchase	6	5	11
	Purchase	6	5	11
Total		12	10	22

$$n_{ij}^e = \frac{\text{row sum} \cdot \text{column sum}}{\text{total sum}} = \frac{n_{i.} \cdot n_{.j}}{n}$$

$$\chi^2 = \sum_{i=1}^{k} \sum_{j=1}^{m} \frac{\left(n_{ij} - n_{ij}^e\right)^2}{n_{ij}^e}$$

UKURAN ASOSIASI

1. Phi

$$PHI = \phi = \sqrt{\frac{\chi^2}{n}}$$

2. Coeficient Contingency

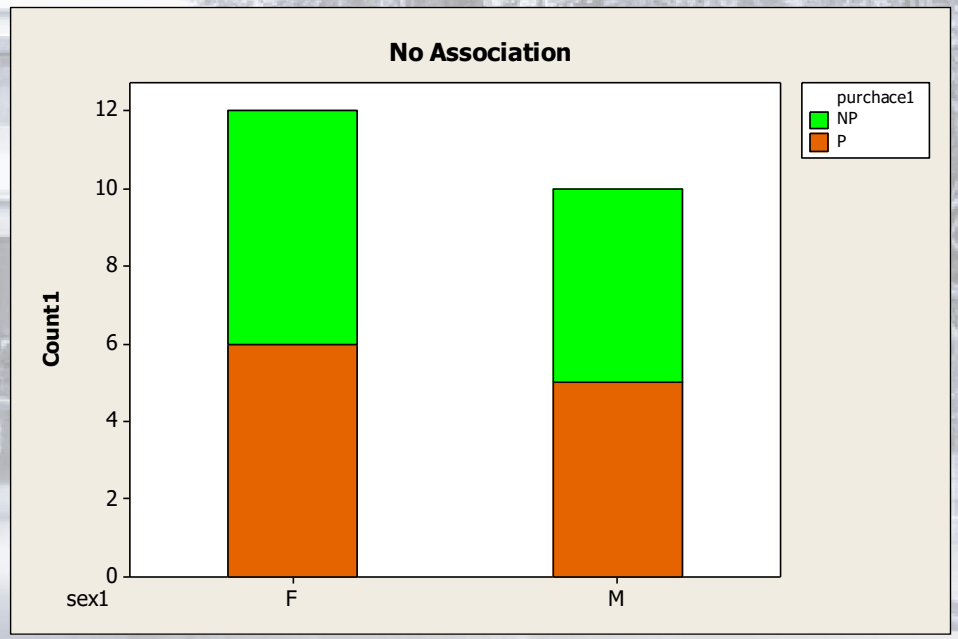
$$C_{korr} = \sqrt{\frac{\chi^2}{\chi^2 + n}} \cdot \sqrt{\frac{\min(k, m)}{\min(k, m) - 1}} = \sqrt{\frac{\chi^2}{\chi^2 + n}} \cdot \frac{1}{\sqrt{1 - \frac{1}{\min(k,m)}}} \in [0; 1]$$

3. Cramer's V

$$\text{Cramer's V} = \sqrt{\frac{\chi^2}{n \cdot (\min(k, m) - 1)}} = \phi * \sqrt{\frac{1}{\min(k, m) - 1}} \in [0; 1]$$

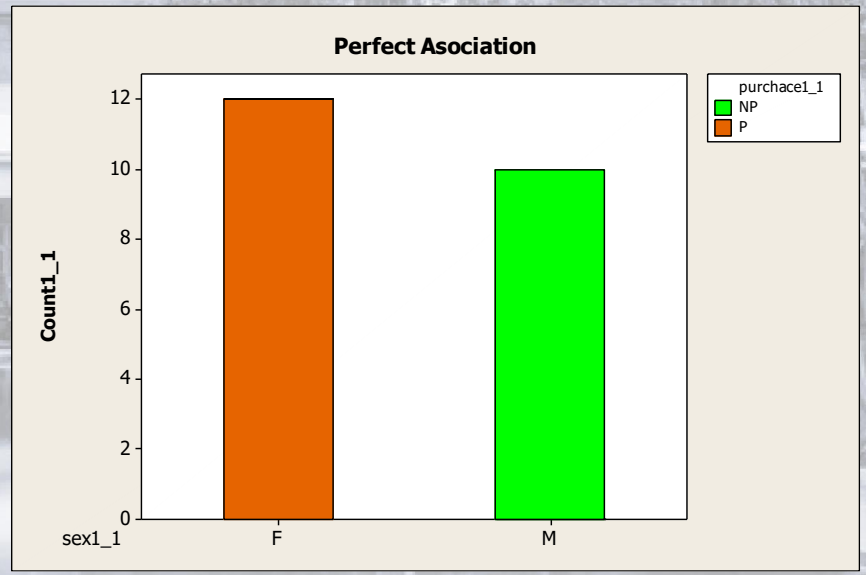
Part 1: No association

			Sex		
			Female	Male	Total
Purchase	No purchase	Count	6	5	11
		Expected Count	6.0	5.0	11.0
	Purchase	Count	6	5	11
		Expect ed Count	6.0	5.0	11.0
Total		Count	12	10	22
		Expected Count	12.0	10.0	22.0



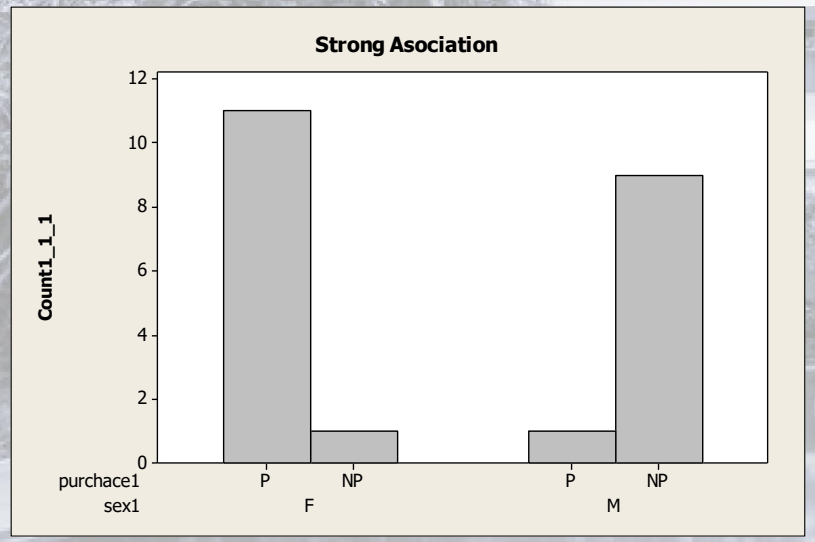
Part 2: Perfection association

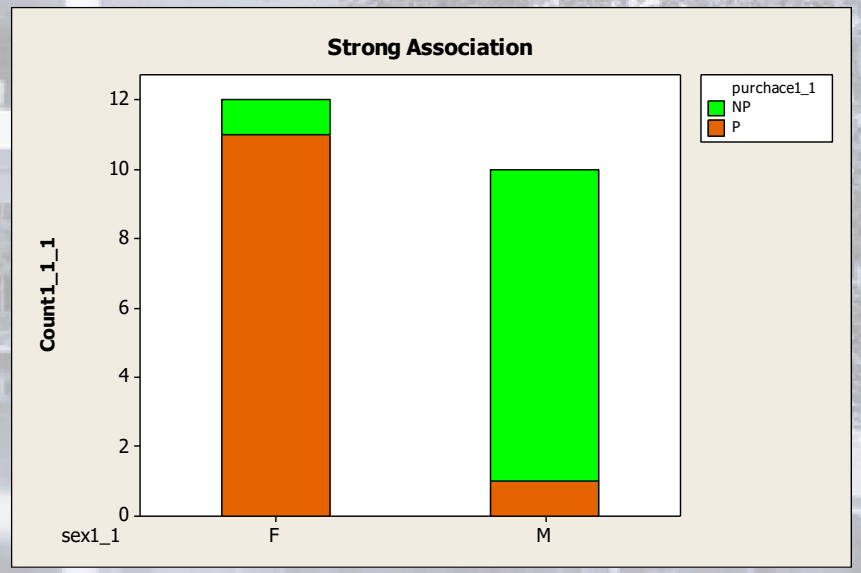
			Sex		Total
			Female	Male	
Purchase	No purchase	Count	0	10	10
		Expected count	5.5	4.5	10.0
	Purchase	Count	12	0	12
		Expected count	6.5	5.5	12.0
Total		Count	12	10	22
		Expected count	12.0	10.0	22.0



Part 3: Strong association

			Sex		
			Female	Male	Total
Purchase	No purchase	Count	1	9	10
		Expected count	5.5	4.5	10.0
	Purchase	Count	11	1	12
		Expected count	6.5	5.5	12.0
Total		Count	12	10	22
		Expected count	12.0	10.0	22.0

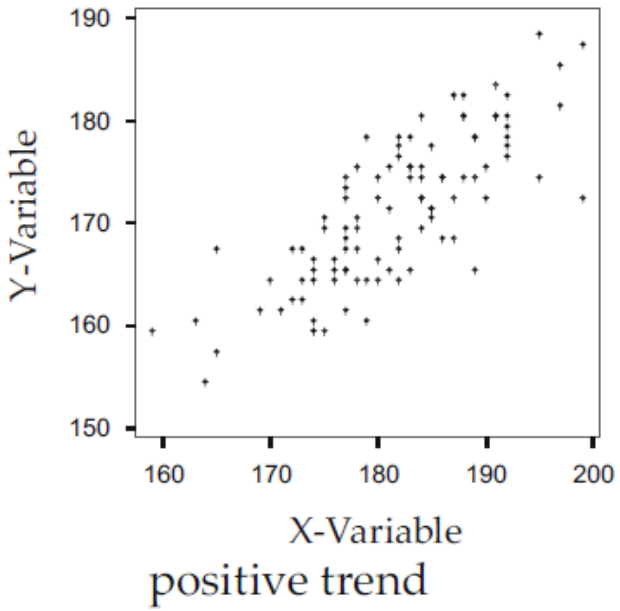




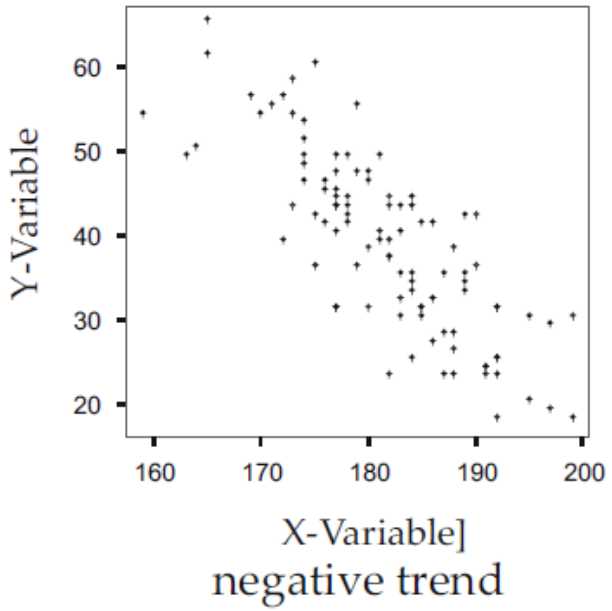
ASOSIASI ANTARA VARIABEL KONTINYU

- Scatter Plot
  - The direction of relationship
    Negative, Positive
  - The form of relationship
    Linear, nonlinear
  - The Strength of relationship
    Strong, weak

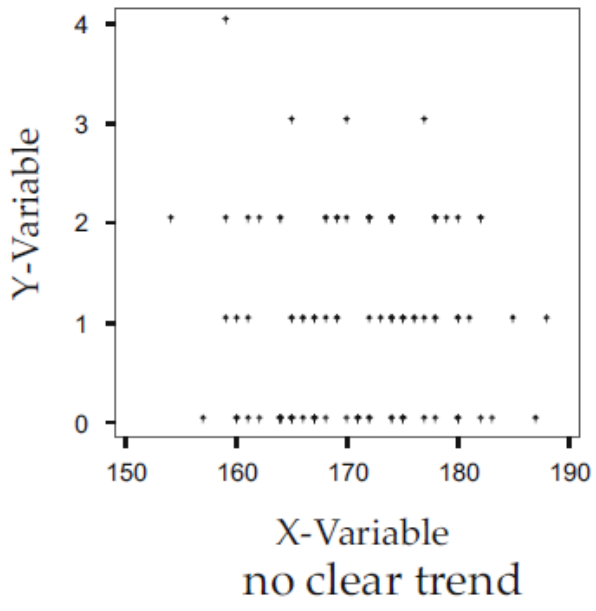
1. The **Direction** of the relationship



positive trend

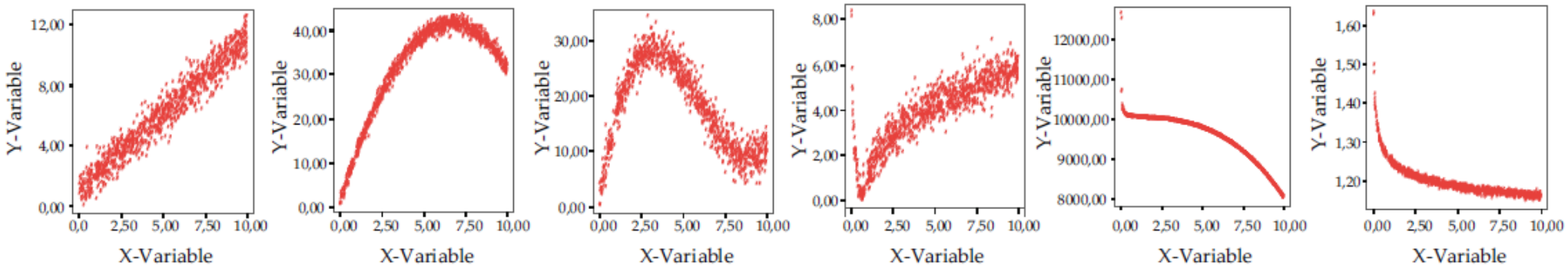


negative trend

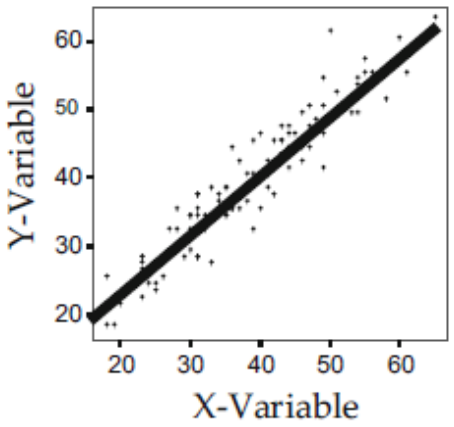


no clear trend

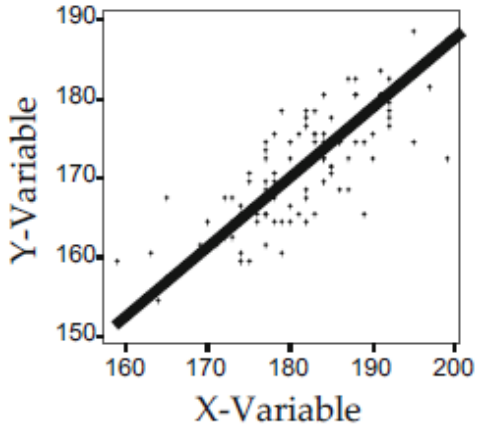
2. The **form** of the relationship



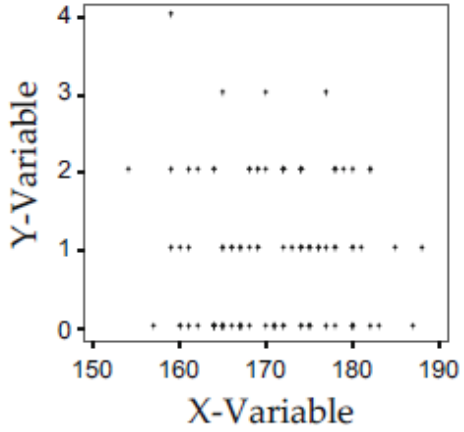
3. The **strength** of the relationship



strong relationsship



weak relationship



no relationship

Pearson Correlation

$$r = \frac{S_{xy}}{S_x S_y} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sqrt{\left(\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2\right) \cdot \left(\frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2\right)}} \text{ with } -1 \leq r \leq +1$$

ASOSIASI NOMINAL DAN METRIC

- There is no commonly applied measure of correlation for nominal and metric variables. The following alternatives are recommended:
  - In practice, statisticians usually apply statistical tests (t-test or variance analysis) to assess differences between nominal groups with regard to metric variables. These tests belong to inductive statistics and require knowledge of probability theory, which lies outside the scope of this book.
  - It is also possible to convert metric variables into ordinal variables via classification and then use an appropriate method such as Cramer's V. But this method is fairly uncommon in practice.
  - Another seldom used approach is the point-biserial correlation (rpb). It measures the association between a dichotomous variable (a special case of a nominal scale with only two values) and a metric variable.