

DEDUCTIVE AND INDUCTIVE THINKING

Sasaran pembelajaran

Setelah mengikuti kegiatan pembelajaran, mahasiswa dapat

- Mahasiswa memahami metode pemecahan masalah
- Memahami dedukti dan induktif thinking
- Memberikan contoh induktif dan deduktif thinking
- Mahasiswa memahami dasar-dasar critical thinking

THE PROBLEM

“Seorang ibu membawa bayinya ke puskesmas. Sudah tiga hari bayi tersebut buang air besar cair dan berlendir sehari lebih dari 5 kali. Bayi kelihatan pucat dan lemas seperti kehilangan banyak cairan. Ibunya menjelaskan bahwa untuk mengurangi berak-berak, bayi telah diberi cairan perasan daun jambu biji, namun berak-berak si bayi belum berhenti juga. Dari pemeriksaan vital sign, dokter menemukan bahwa suhu tubuh bayi 38°C , dan denyut nadi 70/menit. Tidak ditemukan tanda-tanda lain seperti pilek dan batuk.

Based on that scenario, consider:

1. What is his problem?
2. What probably the doctor will do to solve the problem?
3. Why does he have to do that (your answer of question number 2)?

- Problem:

a gap between fact and theory

a gap between what should be and what is being

The facts

- Suhu panas.
- Feses cair lendir
- Nadi 70/mt
- Frekuensi bab 5 x
- Pucat-dehidrasi

Theory:

Normal max 37

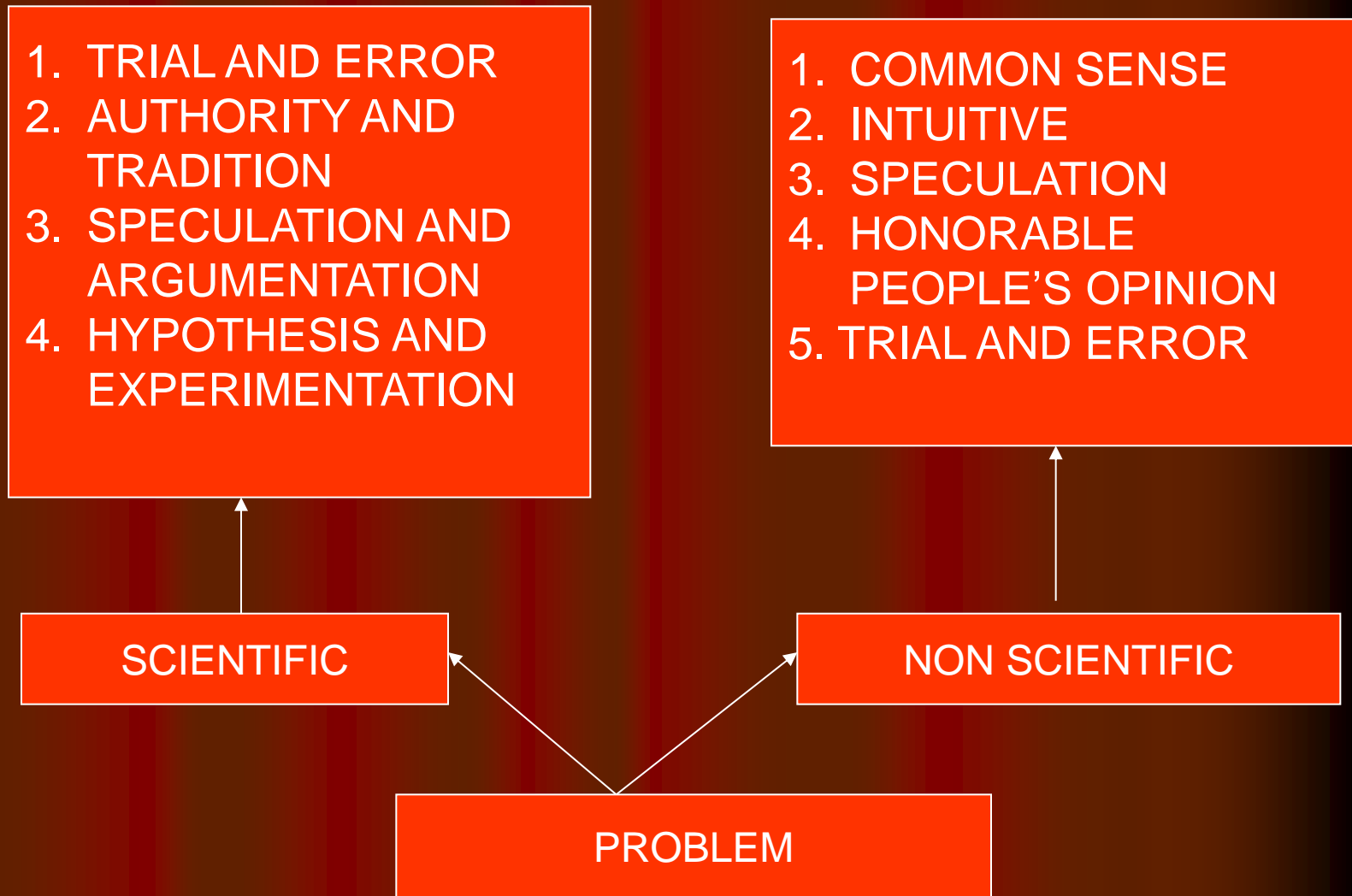
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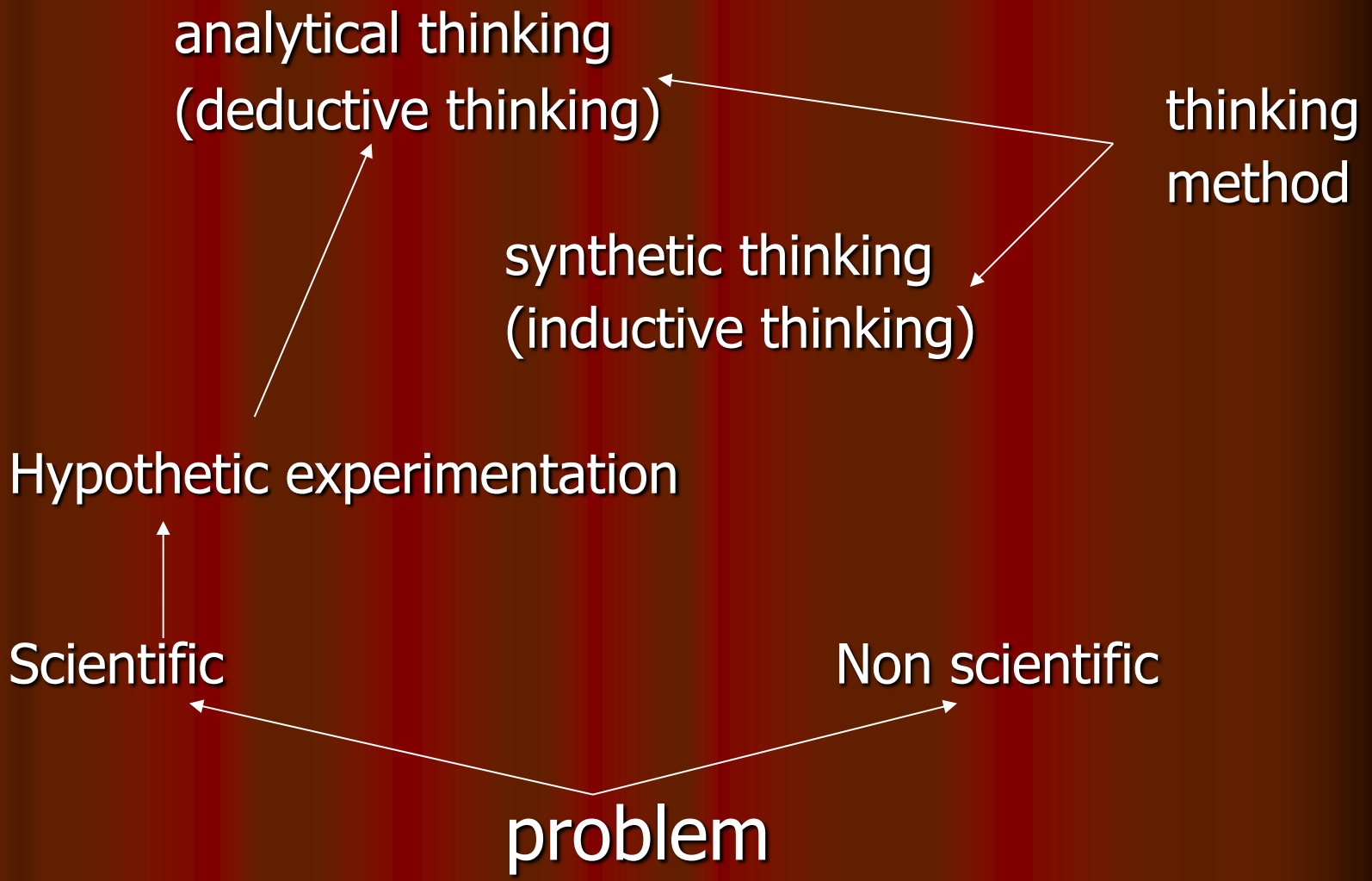
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● How to solve problem





analytical thinking
(deductive thinking)

thinking
method

synthetic thinking
(inductive thinking)

Hypothetic experimentation

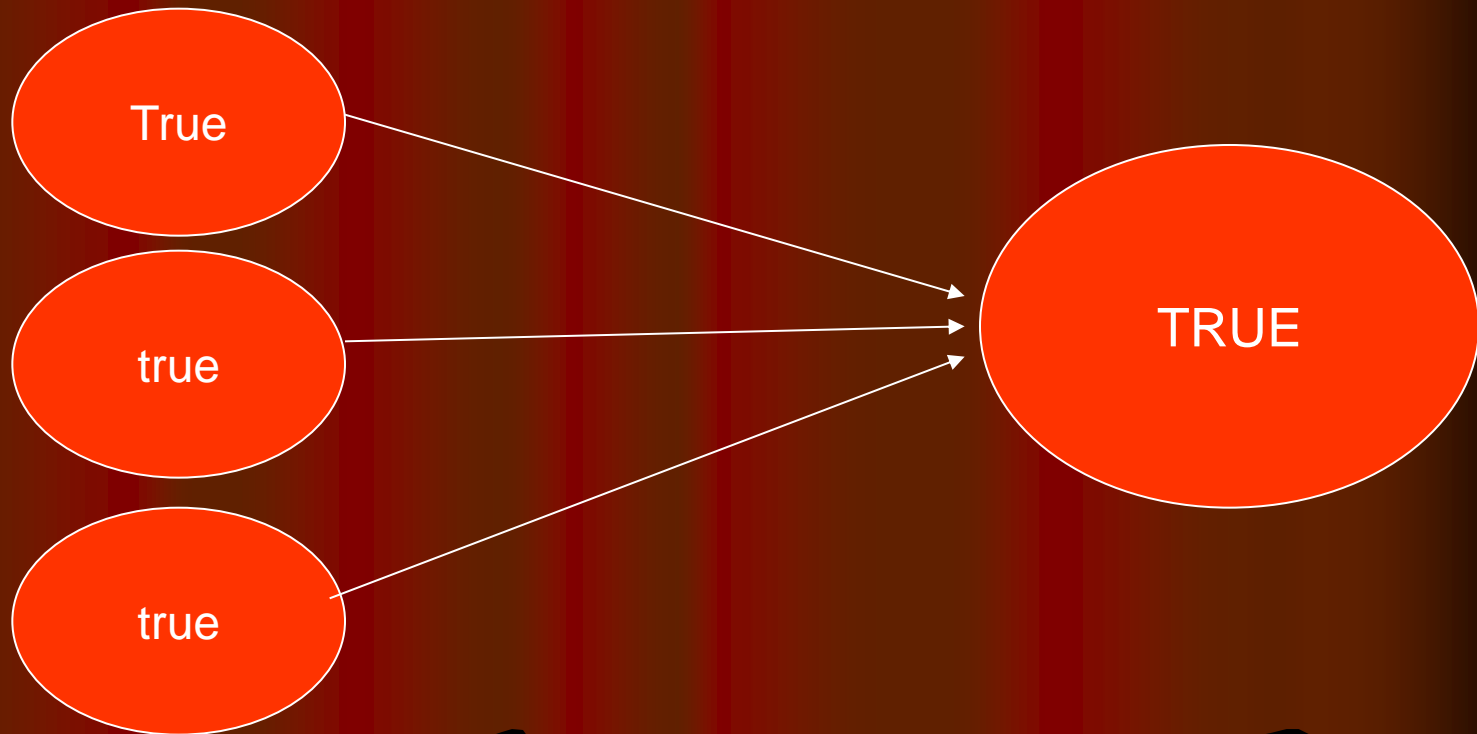
Scientific

Non scientific

problem

Inductive thinking

SPECIFIC TO GENERAL



- Example:

A is smoker and he got hypertension

B is smoker and he got hypertension

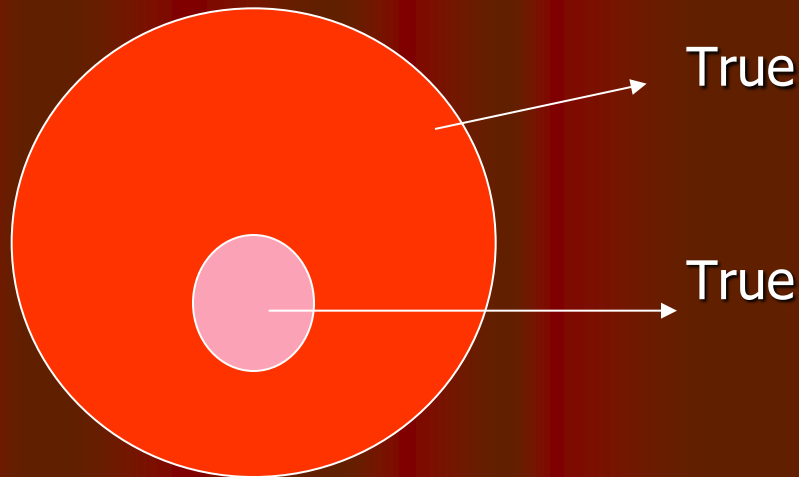
C is smoker and he got hypertension

conclusion:

all smokers got hypertension

Deductive thinking

GENERAL TO SPECIFIC



example:

Theory: Peroxide hydrogen H_2O_2 is an effective substance to kill bacteria

Fact : Honey consists of peroxide hydrogen

Hypothesis: Honey effectively kills bacteria

- There is an influence of age to hypertension
- There is an influence of sex to hypertension
- There is an influence of stress level to hypertension
- There is an influence of smoking to hypertension

Conclusion:

Age, sex, stress level, and smoking might influence hypertension.

HYPOTHESIS

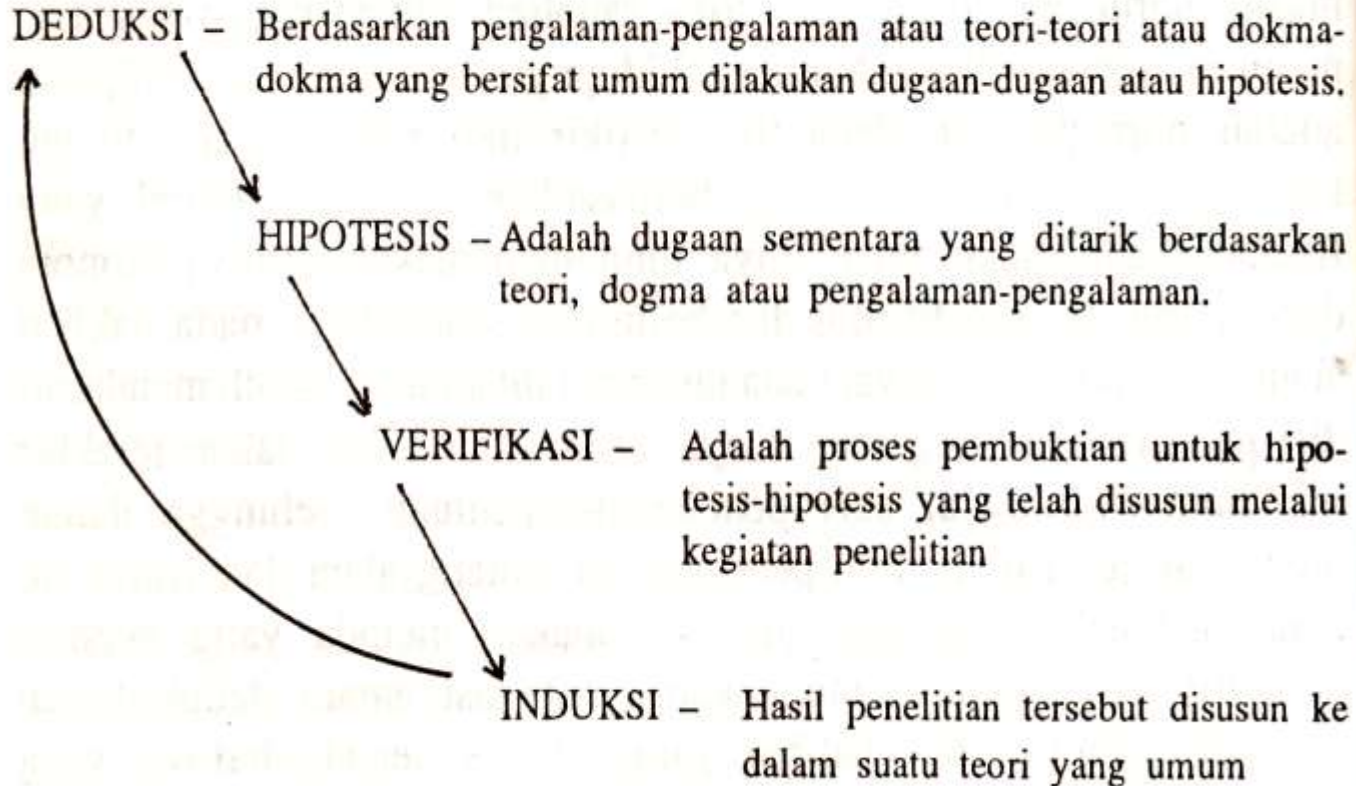
- UNPERMANENT CONCLUSION
- NEED TO BE TESTED TO PROOVE ITS TRUTH

TESTED??

WHAT SHOULD BE DONE?

AGUST COMTE (1798-1857)

Metoda Deducto-Hipotetico-Verifikatif



- PROBLEM:
Bayi mencepet cair dan berlendir lebih dari 3 hari, dehidrasi, suhu tubuh lebih dari 37°C, denyut nadi lemah
- Deductive thinking:
 - panas merupakan salah satu tanda adanya infeksi
 - mencepet cair dan lendir: ada kemungkinan infeksi GI tract
 - Dehidrasi akibat kekurangan cairan
- Hypothesis:
 - bayi menderita infeksi bakterial pada GI tract
- Verification step:
 - verifikasi data: pemeriksaan vital sign, pemeriksaan fisik, pemeriksaan feses, anamnesis, etc.
 - analyze the data and draw conclusion
 - terapi
- Inductive new theory

- PROBLEM:
what are factors that influence hypertension?
- Deductive thinking:
 - old people got hypertension
 - there is an influence of genetic and sex to hypertension
 - stress level influence hypertension
 - DM leads to hypertension
- Hypothesis:
age, sex, genetic, stress level, and DM are factor causes hypertension
- Verification step:
 - gather data of sex, age, stress level and DM from hypertension as well as non-hypertension patients, contrast the data,
 - analyze the data and draw conclusion
- Inductive new theory

General mistakes

- Mistake in finding the problem, cannot find gap between fact and theory
- Mistake in stating hypothesis
- Mistake in verifying data needed
- Mistakes in drawing conclusion

All of the mistakes led to wrong conclusion and therapy.

CRITICAL THINKING

Involved ability in

- Identifying problems
- Clarifying and focusing problems
- Analyzing the problems
- Understanding and making use of inferences
- Inductive and deductive logic
- Judging the validity and reliability of the assumption
- Searching data and information available
- ***Evaluating (core ability)***
- Etc.

EVALUATING ARGUMENT:

- CONSISTENT WITH EACH OTHER
- DISTINGUISH FACT AND OPINION

CRITICAL THINKER

- Reasoned judgments
- Reflective
- Ability to analyze
- Evaluate evidence
- Problem solving
- Making inference
- Examining evidence
- Making reasoned arguments to support conclusion
- Explain the pattern of your thinking

WHY SHOULD BE REASONING

- For a purpose
- For solving problems
- Gathering information in light of the problem
- Interpreting information
- Using concepts
- Making assumption
- Implications of interpretation
- consequences

LOGICAL THINKING

John Dewey (1933) and Kelley (1932)

- The felt need
- The problem
- The hypothesis
- Collection of data as evidence
- Concluding believe
- General value of the conclusion
(implication)

Characters of researcher

1. **skeptic thinking**: need fact or evidence to support statements and action
2. **analytical thinking**: analyzed every statement and problem
3. **critical thinking**: his action, opinion, based on logical perception, objective data and analysis.
4. **Competent**
Able to conduct research using appropriate method and techniques
5. **Objective**
He never makes use of personal judgment
6. **Honest**
He never interferences data
7. **Factual**
Work based on factual data
8. **Open**
Open to critic