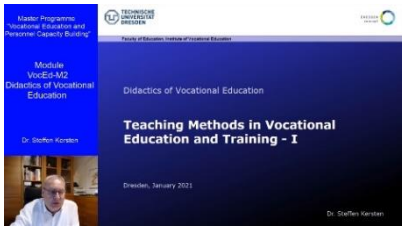
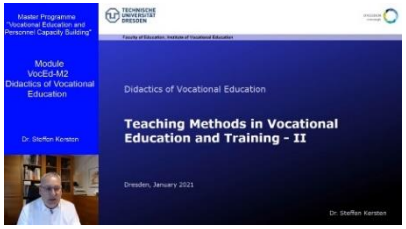
Didactics of Vocational Education

Teaching Methods in Vocational Education and Training - II

Dresden, April 2022

Prof. Dr. Steffen Kersten

BIT Semester plan „Dicatics of Vocational Education“
March 2022 - May 2022 Module VocEd – M2

Video-Lecture	Relevant sections in the study material	Exercises	Relevant exam tasks
 Cognitive teaching methods (66 min)	Chapter 5 p. 51 - 57	- Develop an own example for one path of cognition!	- Explicate the term “Teaching method”! - Draw up a lesson plan using a path of cognition! - Which factors do you have to consider, when you choose a path of cognition for your lesson?
 Logical basics of cognitive learning (56 min)		- Develop your own example of evidence or falsification!	
 Didactic functions -orientation- (70 min)	Chapter 5 p. 42 - 47	- Formulate 3 cognitive learning goals at different levels of the learning goal taxonomy according to Benjamin BLOOM!	- Point out the structuring of vocational lessons by didactic functions! - Explain the relationship between stages of learning acts, didactic intentions and didactic functions! - Describe ways to prepare the learner cognitively, emotionally and motorically for the learning activities! - Why is the holistic orientation so important in vocational training!

Deductive (II) Teaching methode

Deduction:

initial statements (Premise)

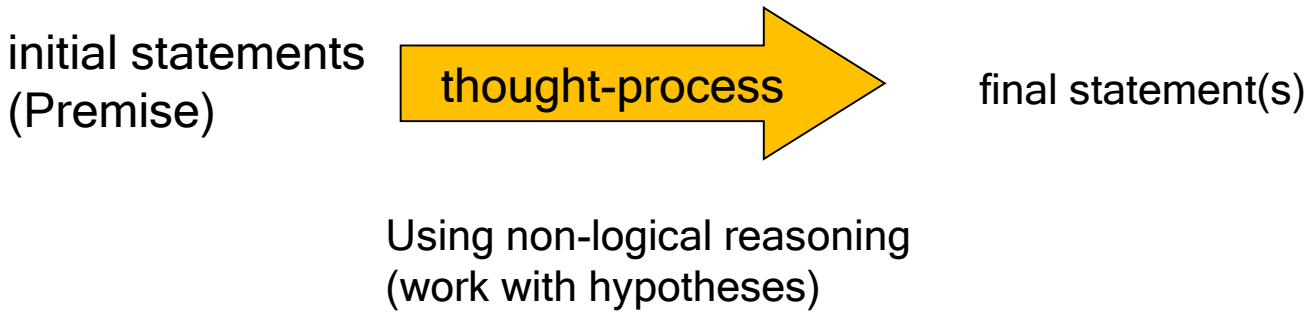
concluding statement (conclusion)

Using logical reasoning

The deductive proceeding in class is characterized by the logically consistent deduction of the realization from true initial statements.

Reductive Teaching method

Reduction:



The reductive proceeding in class ist characterized by the development and confirmation of hypotheses.

Propositional logic

Logical relationships are relationships between facts of reality or between statements relating to their occurrence or their truth**.**

logical equivalence, logical consequence, logical antilogies

Truth value operations are combinations of statements with special logical combination services.

e.g. and, or, if-then

Logical Relationships

A1: A triangel is equilateral (3 equal sides)
A2: A triangel has equal angels.

A1	A2	
T	T	**T**
T	F	**F**
F	T	**F**
F	F	**T**

→ **Logical Equivalence**

Between the two expressions A1 and A2 is the **logical equivalence**, if for structural reasons, the two expressions always have the same truth value.

A1: If X, then Y
A2: Not X or Y

Logical Relationships

A1: The Petrol in my car is used up.
A2: The engine in my car stalls.

A1	A2	
T	T	**T**
T	F	**F**
F	T	**T**
F	F	**T**

→ **Logical consequence**

Between two expressions A1 and A2 is the **logical consequence**, if for structural reasons, with the truth of A1 is necessarily given the truth of A2.

A1: If X, then Y and X
so
A2: Y

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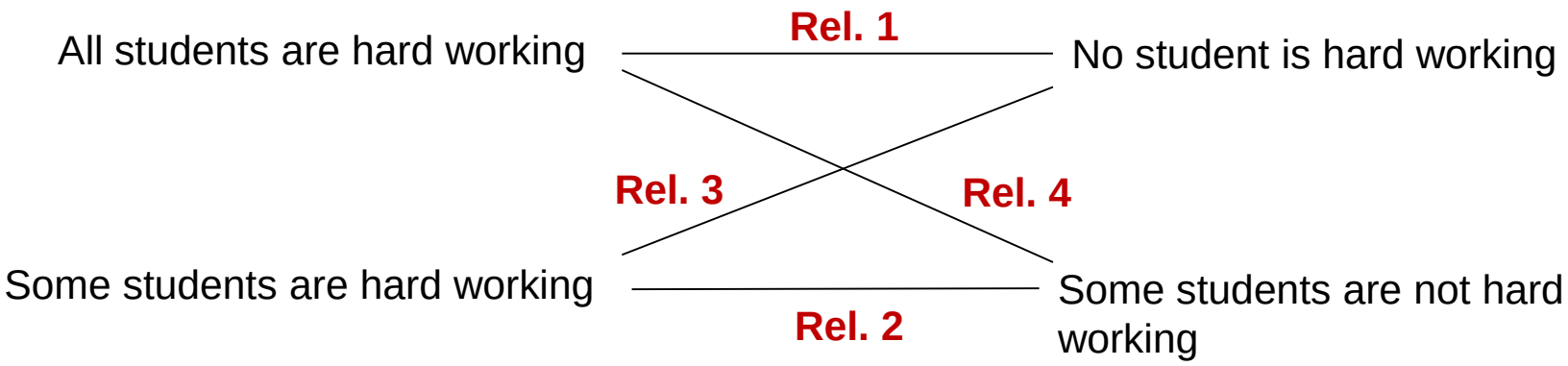
Logical Antilogies



A1	A2	Rel. 1	Rel. 2	Rel. 3	Rel. 4
T	T	F	T	F	F
T	F	T	T	T	T
F	T	T	T	T	T
F	F	T	F	F	F
		contrary antilogy	subcontrary antilogy	contradictory antilogy	contradictory antilogy

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Logical Antilogies

Two expressions A1 and A2 are in **contrary antilogy**, if for structural reasons, both expressions can not together be true

Two expressions A1 and A2 are in **subcontrary antilogy**, if for structural reasons, both expressions can not together be false.

Two expressions A1 and A2 are in **contradictory antilogy**, if for structural reasons, both expressions have a different truth value.

Quelle: Zimmer, H.: Elemente der Logik für die Unterrichtspraxis, Lehrbrief 3 Dresden 1984, S.19ff)

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Logical Relationships - Summary

Between the two expressions A1 and A2 is the **logical equivalence**, if for structural reasons, the two expressions always have the same truth value.

Between two expressions A1 and A2 is the **logical consequence**, if for structural reasons, with the truth of A1 is necessarily given the truth of A2.

Two expressions A1 and A2 are in **contrary antilogy**, if for structural reasons, both expressions can not together be true.

Two expressions A1 and A2 are in **subcontrary antilogy**, if for structural reasons, both expressions can not together be false.

Two expressions A1 and A2 are in **contradictory antilogy**, if for structural reasons, both expressions have a different truth value.

Quelle: Zimmer, H.: Elemente der Logik für die Unterrichtspraxis, Lehrbrief 3 Dresden 1984, S.19ff)

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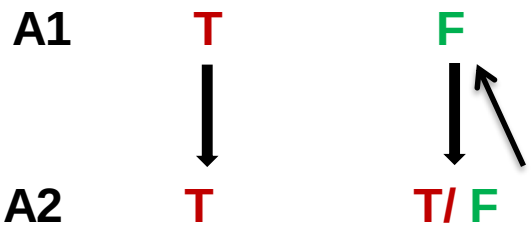
Truth value operations

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
A	B	⊤	v	⬅	⟌	➡	⟍	⬌	∧	|	⋌	⌐	≻	¬	≺	⬇	⊥
T	T	T	T	T	T	T	T	T	T	F	F	F	F	F	F	F	F
T	F	T	T	T	T	F	F	F	F	T	T	T	T	F	F	F	F
F	T	T	T	F	F	T	T	F	F	T	T	F	F	T	T	F	F
F	F	T	F	T	F	T	F	T	F	T	F	T	F	T	f	T	F

1. Tautology: in any case, whether A or B
2. Alternative: at least A or B
3. Replication: only if A, then B (A is necessary for B)
4. Prependency: definitely A, regardless of whether B.
5. Implication: if A, then B (A is sufficient for B)
6. Postpendency: no matter if A, definitely B
7. Equivalence: exactly if A then B (A is necessary and sufficient for B)
8. Conjunction: both A and B, or A and B
9. Exclusion: A or B at most
10. Antivalence: Either A or B
11. Postnonpendency: No matter if A, definitely not B
12. Postsection: A without B
13. Prenonpendency: under no circumstances A, regardless of whether B
14. Präsektion: without A, B
15. Nicodic function: Neither A nor B
16. Antilogy: Not at all, no matter if A or B.

Logical consequence

A1	A2	
T	T	**T**
T	F	**F**
F	T	**T**
F	F	**T**



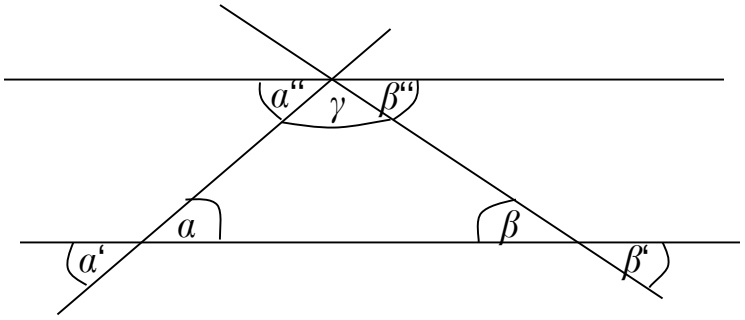
Between two expressions A1 and A2 is the **logical consequence**, if for structural reasons, with the truth of A1 is necessarily given the truth of A2.

Evidence: The thesis is consequently derived from true premises.

Falsification: From the thesis a false statement or a contradiction becomes consequently derived

The direct evidence

example:



premises:

1. a‘“+ y + b“ = 180°
2. law of vertex angle : a‘ = a und b‘ = b
3. law of step angle : a“ = a‘ und b“ = b‘

Logical consequence:

1. a = a‘ = a“ und b = b‘ = b“
2. **a + b + y =180° → thesis**

premises = true

↓ logical consequence

conclusion = true
→ thesis

The direct evidence

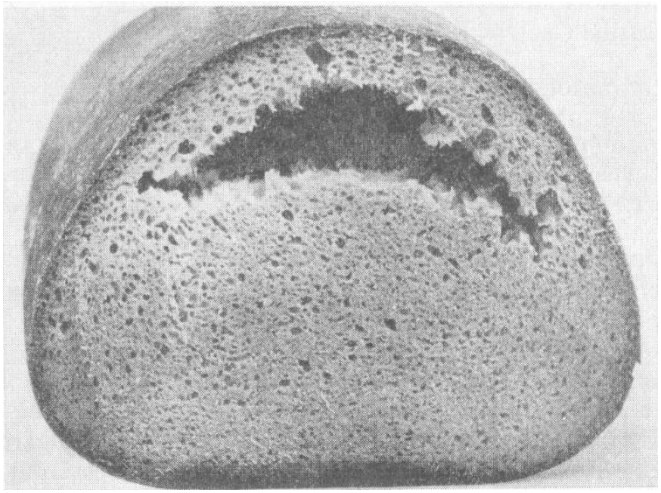
premises:

A1: In young sourdoughs, the dough is still not evenly interspersed with strong gas developers. (e.g. yeast)
AND
A2: Use of dough that is not evenly interspersed with strong gas developers leads to uneven pore structure in the pastry.

↓ logical consequence

Conclusion:

C: The use of young sourdoughs in bakery production leads to irregular pore structure in the pastry.



The direct falsification

hypothesis: The social status in the family has no influence on the educational success of the children. **= F**

premises:
- The social status of families is defined by educational qualifications, income and occupation.
- The educational success is shown by certificates, educational qualifications, results in standardized school performance tests.

logical consequence:
- The achievement of educational qualifications is independent of the educational qualification of the parents.
- The results of school performance tests are independent of the family's income.

= F

= F

hypothesis

+ premises = T

logical consequence

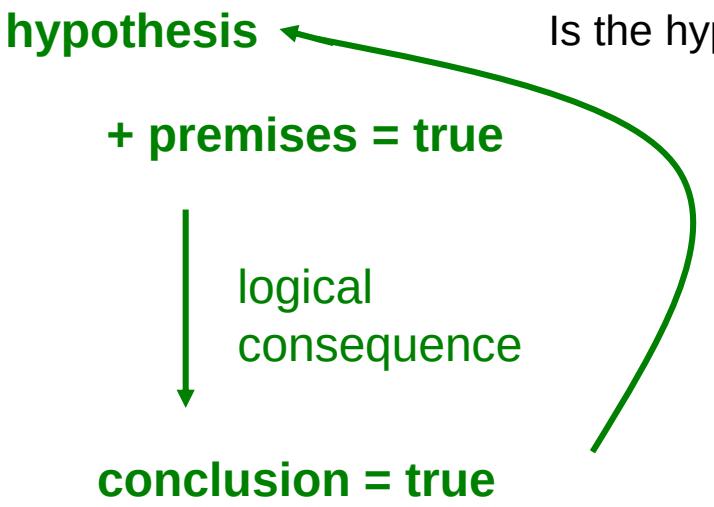
conclusion = F

contrary antilogy

Reality in Germany:

1. Only 15% of young adults with parents without a high school diploma achieve a university degree.
2. In the 2015 Pisa test, 15-year-old students from low-income households scored 466 points in the natural sciences, and students from high-income households 569 points. The difference corresponds to 3 school years.

Confirmation



logical consequence:

A1:	T	F
	↓	↓
A2:	T	T/F

A true conclusion can also derived from wrong premises.

h: All A are B.
p: All B are C.

---

c: All A are C.

h: All whales are fish.
p: All fish are aquatic animals.

---

c: All whales are aquatic animals.

logical consequence:

A1:	T	F
	↓	↓
A2:	T	T/F

Debilitation

premises
(at least 1 premise = F)

logical consequence

conclusion

Is the conclusion wrong because it was derived from wrong premises?

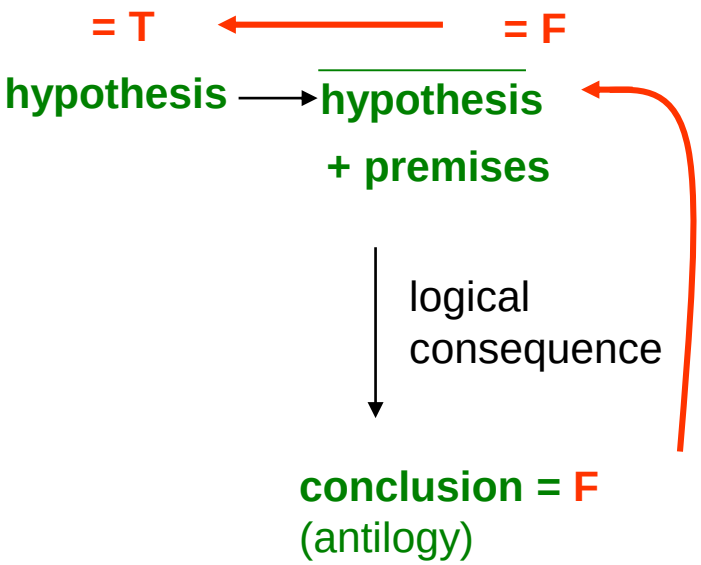
It is possible to derive a true conlusion
from a wrong premise.

logical consequence:

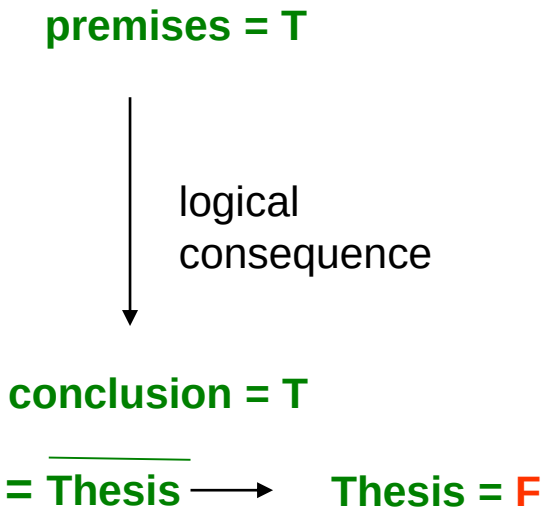
A1:	T	F
	↓	↓
A2:	T	T/F

Indirect evidence und indirect falsification

Indirect evidence



Indirect falsification



Thank you for your attention!

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