I am dying from the treatment
of too many physicians.
Alexander the Great

Universität Konstanz

Diagnostic performance by medical students working individually or in teams

Hautz, W. E., Kämmer, J. E., Schauber, S. K., Spies, C. D., & Gaissmaier, W. (2015). Diagnostic performance by medical students working individually or in teams. *JAMA, 313*, 303-304. doi:10.1001/jama.2014.15770

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Diagnostic Errors in Medicine

Rate of diagnostic error is estimated to be about 15% (Elstein, 1995)

Cognitive errors contribute to 74% of these errors (Graber, Franklin, & Gordon, 2005)

- Faulty knowledge
- Faulty data gathering
- Faulty synthesis

⇒Can teamwork reduce diagnostic errors?

⇒How does teamwork change the diagnostic process?

Method

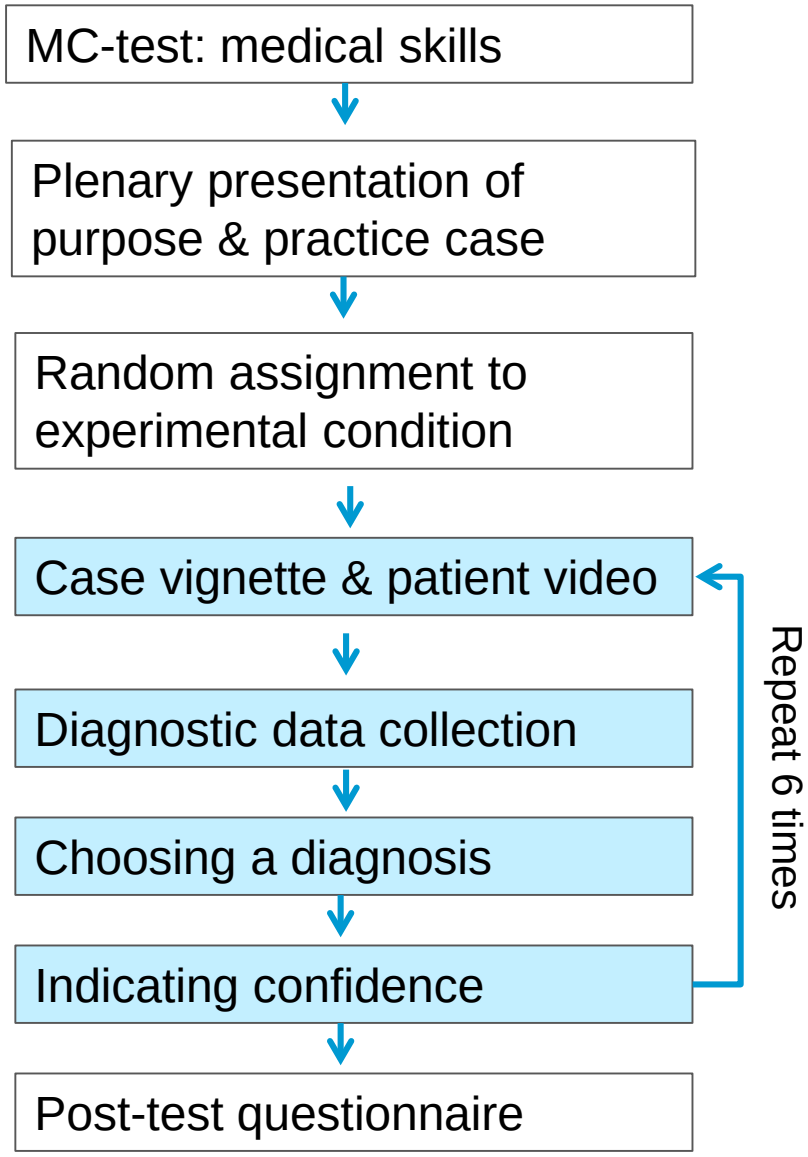
Experimental task:
Diagnose six patients with respiratory problems

Experimental conditions:

- **alone (n=28 individuals)**
- **in dyads (n = 30 dyads)**

***N* = 88 medical students (4th semester)**

flat- fee of €25



Case vignette & patient video

↓

Diagnostic data collection

↓

Choosing a diagnosis

↓

Indicating confidence

Video of patient with respiratory problems

PRIMÄRE DIAGNOSTIK IM ZIMMER

WEITERFÜHRENDE DIAGNOSTIK

PATIENTENGESPRÄCH

AKTE EINSEHEN

KURVE EINSEHEN

ERSTMAßNAHMEN

>WEITERFÜHRENDE DIAGNOSTIK

RÖNTGEN THORAX

ARTERIELLE BGA

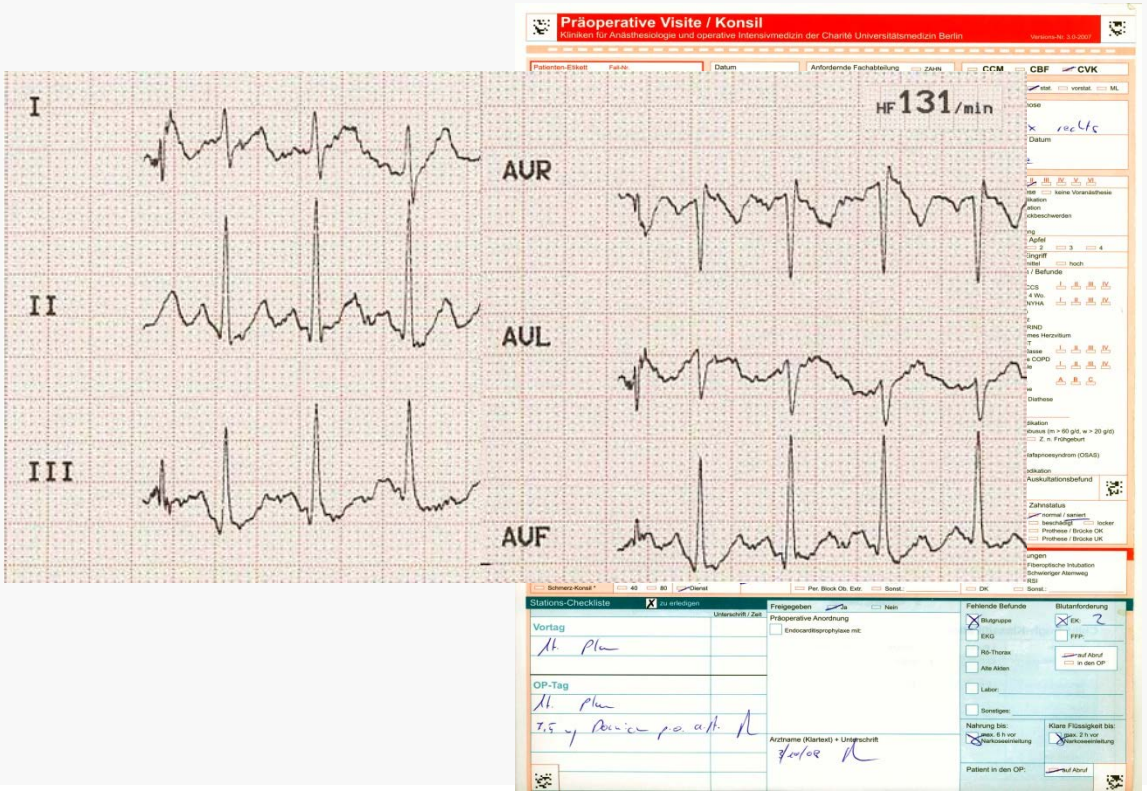
SONOGRAPHIE DES THORAX

TRANSTHORAKALES HERZECHO

CT-THORAX OHNE KONTRASTMITTEL

CT-THORAX MIT KONTRASTMITTEL

DIAGNOSE



Case vignette & patient video

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Diagnostic data collection

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Choosing a diagnosis

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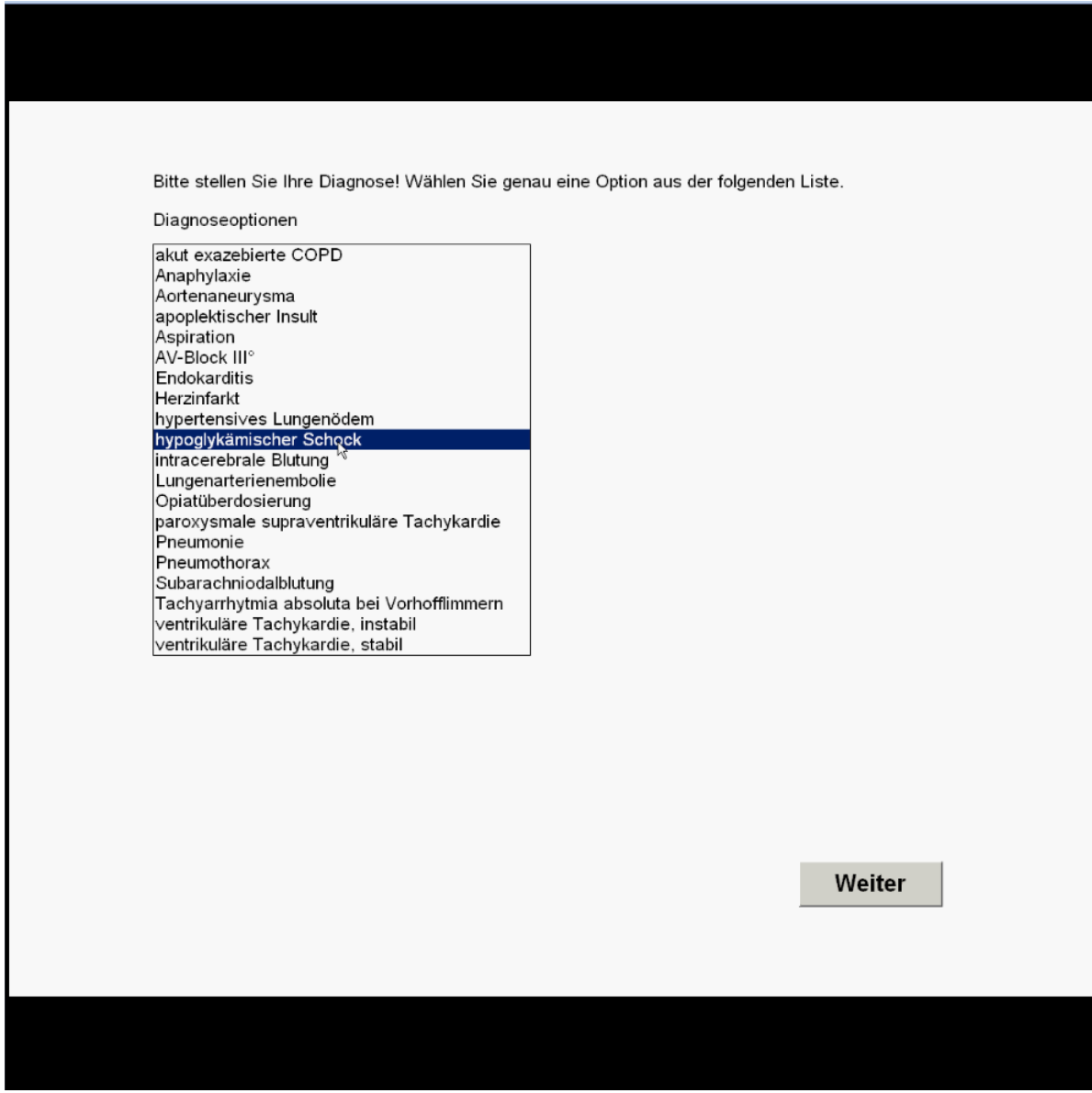
Indicating confidence



Case vignette & patient video

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Diagnostic data collection

↓

Choosing a diagnosis

↓

Indicating confidence

How confident are you that your diagnosis is correct?

1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 – 10

lowest confidence — highest confidence

Dependent Variables

Number of correct diagnoses (max. 6)

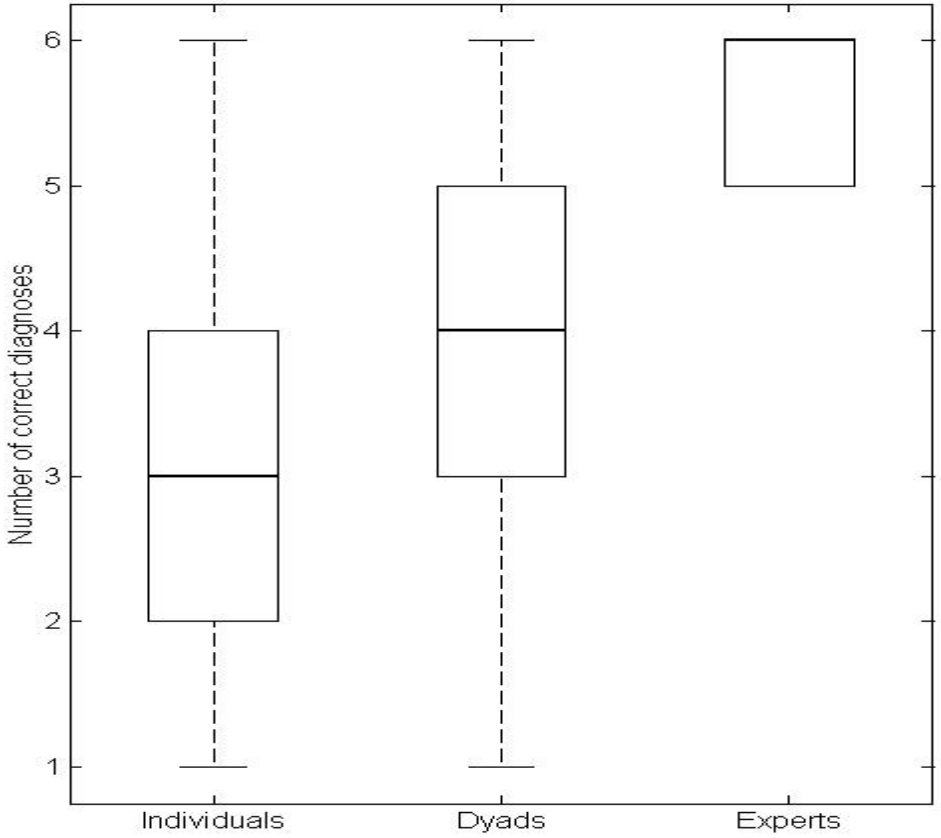
Measures of information search:

- Number of acquired diagnostic tests (max. 30)
- Relevance of acquired diagnostic tests (based on validation study with 20 experts)
- Duration of diagnoses in experiment and how long tests would have taken in reality

Confidence judgments (1-10)

Results: Diagnostic Errors

Dyads had more correct diagnoses than individuals (4/6 vs. 3/6; *d* = 0.78)



Results: Diagnostic Errors

Dyads had more correct diagnoses than individuals
(4/6 vs. 3/6; *d* = 0.78)

Not a statistical artifact due to the higher probability of having a competent individual in a team:

Simulation of nominal dyads

Diagnosis based on „better“ team member – „better“ defined in 3 ways:

- more confident
- higher medical knowledge
- acquired tests more relevant

Result: nominal dyads = individuals < real dyads

Results: Diagnostic Process

Same number of acquired diagnostic tests (approx. 15 out of 30)

Same relevance of acquired diagnostic tests

Dyads slower than individuals in experiment (per diagnosis 4.5 vs. 2.4 min, η_p^2 = .90)

Dyads‘ acquired tests would be faster in reality than those of individuals (per diagnosis 30 vs. 37 min, η_p^2 = .63)

Results: Confidence Judgments

Confidence judgments (1-10)
dyads > individuals (7.01 vs. 5.92, η_p^2 = .84)
if correct > if incorrect (η_p^2 = .28)
dyads not better calibrated than individuals

When dyads were incorrect, there was a larger difference between the confidence judgments of the two members than when they were correct
$\Rightarrow$ **could this be harvested as cue for incorrect diagnoses?**

Discussion

Teamwork reduces diagnostic errors without altering the diagnostic process

Not an artefact of the better member

⇒Collaboration seems to yield better interpretation: it may have helped correct errors, fill knowledge gaps, and counteract reasoning flaws.

⇒Future studies should examine whether a difference in confidence between members could indicate incorrect diagnoses and thus further reduce diagnostic errors, as results suggest

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