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BENEFITS OF NEGATIVE MARKING AT THE EUROPEAN BOARD OF OPHTHALMOLOGY DIPLOMA (EBOD) EXAMINATION, BOTH FOR ORGANISER & CANDIDATES

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Disclosure of interest

- I, **Danny G.P. Mathysen** DO NOT have a financial interest/arrangement or affiliation with one or more organisations which could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.



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INTRODUCTION AND RESEARCH QUESTIONS

Introduction:

The European Board of Ophthalmology Diploma (EBOD) examination consists of a **written examination** (presented in this poster), followed by an oral examination. The written part of EBOD contains 52 **MCQs** with 5 **multiple true-false** items each (260 answers to be given by the candidates), with a pre-defined distribution of 10 **topics** within ophthalmology (more details on EBO website: <http://www.ebo-online.org>).

	A			B			C			D			E		
1	☒	☐	☐	☐	☒	☐	☒	☐	☐	☐	☐	☒	☒	☐	☐

Research questions:

1. Does the introduction of **negative marking** at EBOD (*to avoid wild guesses with a probability as high as 50% to be correct*) have a **positive effect** on the **statistical performance** parameters of all EBOD test items **in total** and test **items individually** and?
2. Does **negative marking** have a **discriminative** effect towards **female candidates**, (main argument against negative marking according to literature)?



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STUDY POPULATION, DATA ANALYSIS AND RESULTS

Study population:

In 2009 a total of 308 candidates (185 males and 123 females) took part at EBOD **without negative marking**. In 2010 a total of 310 candidates (168 males and 142 females) took part at EBOD **with negative marking**.

Data analysis and Results (Statistical performance parameters):

Statistical Performance Parameter	Parameter: Rule of thumb	2009	2010
General statistical performance of EBOD (i.e. all items) Cronbach-α value (internal consistency) <i>to be considered as the degree to which all test items are measuring the same (i.e. knowledge of candidates)</i>	Cronbach-$\alpha \geq 0.80$	0.78	0.87
Statistical performance of individual EBOD items (average) P-value (percentage of correct answers) <i>to be considered as an estimation of the level of difficulty (or facility) of test items</i> Rit-value (correlation of item score with EBOD score) <i>to be considered as the degree to which a test item has an added value to the total examination</i>	$0.10 < P\text{-value} < 0.90$ Rit-value ≥ 0.15	0.79 0.14	0.66 0.18



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DATA ANALYSIS AND RESULTS, DISCUSSION

Data analysis and Results (Male versus Female):

2009 – Male versus Female candidates (χ^2 test)		2010 – Male versus Female candidates (χ^2 test)	
Difference between pass – fail?	$p = 0.909$ (NS)	Difference between pass – fail?	$p = 0.286$ (NS)
Difference between scores (1–10)?	$p = 0.430$ (NS)	Difference between scores (1–10)?	$p = 0.264$ (NS)
		Difference between “Don’t know”	$p = 0.02$ (S)

Discussion:

- The **rationale** behind **negative marking** relies upon the fact that with true-false test items the **probability** of a **correct answer** by **guessing** is as high as **50 %**, due to which the **level** of the non-able or **borderline candidates** is generally assumed to be **over-estimated**. Hence, the space available to **discriminate** able from borderline candidates is (too) **limited**.
- The main **argument against** negative marking as described in literature, is the **assumption** that negative marking would be **discriminative towards females**.



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DISCUSSION AND CONCLUSION

Discussion:

- Cronbach- α value: has **improved** after introduction of negative marking
- P-value: was **no longer over-estimated** with negative marking
- Rit-value: has **improved** after introduction of negative marking
- Males vs. Females:
 - Female candidates are **less keen to guess** (significance) (female candidates choose more for “Don’t know”)
 - Female candidates have the **same chances to pass** EBOD as male candidates (no significant difference in scoring)

Conclusion:

The introduction of **negative marking** for EBOD has proven to be **very successful**, with **benefits** for both:

- the **organiser** of the examination (statistical performance parameters), and
- the **candidates** (better discrimination with borderline candidates).