# 43.408 - The capability of electroretinograms to detect a reduced detection of photons by photoreceptors

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**Purpose**

**Aim of the study:** compare the ability of psychophysical tests (photon noise and motion contrast sensitivity at 15 Hz), and three ERGs (pattern, full-field and multifocal) to detect a decrease in photon detection (simulated by a reduction in light intensity) in young adults.

**Methods**

20 young (mean = 26.5 years) Monocular viewing with a neutral density filter of 0.6

**Viewing conditions**
- Baseline
- ND filter 0.6

**ERGs**

**ERG Pattern**

**ERG Full Field**

**ERG Multifocal**

**Psychophysique**

**Stimuli**
- 2AFC paradigm (right or left)
- With and without dynamic white noise
- Monocular viewing with a 3 mm artificial pupil

**Photon noise**
- Luminance : 10 cd/m2
- Temporal frequency : 2Hz
- Spatial frequency : 0.5 cpd

**Motion contrast sensitivity**
- Luminance : 25 cd/m2
- Temporal frequency : 15Hz
- Spatial frequency : 0.5 cpd

**Results**

**ERG Pattern**

**ERG Full Field**

**ERG Multifocal**

**Phonon noise test**

Motion - 2Hz

Motion - 2Hz noise

Photon Noise

Motion - 15Hz

**Motion contrast sensitivity**

**ROC**

**AUC**

Our two psychophysical tests, photon noise and motion contrast sensitivity at 15 Hz, were found to be effective in distinguishing healthy participants from those with reduced photon detection by photoreceptors simulated by filters, however motion contrast sensitivity at 15 Hz performed better than photon noise.

 Electrophysiological tests are not the most suitable tests to detect a decrease in photon detection by photoreceptors. Indeed, they all discriminate less easily the reference condition from the reduced photon detection condition, compared to psychophysical tests.

**References**

Braham chaouche et al. (2020), (vol 2), (pp 1-21), A new functional test sensitive to a reduction in light absorption by photoreceptors.

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