

The Boston Child Self-Refractive Study

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Bruce Moore OD

Marcus Professor of Pediatric Studies
Chair Department of Specialty and Advanced Care

New England College of Optometry
Boston USA

New England College of Optometry: Bruce Moore OD, Catherine Johnson OD, Stacy Lyons OD, Nicole Quinn OD, Paulette Tattersall BS Pharm

Oxford University: Josh Silver PhD, David Crosby PhD, Graeme MacKenzie PhD

Zhongshan Ophthalmic Centre: Nathan Congdon MD, Mingguang He MD

National Eye Institute: Leon Elwein PhD

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Prevalent ocular conditions in children

- Significant refractive error
- Amblyopia
- Strabismus
- Eye disease

Scope of the problem in the developing world

- Huge population of children
- Lack of manpower
- Access to care
- Allocation of resources

Comparisons in the vision care milieu between developed and developing worlds

- Most people probably think mainly of the differences

Comparisons in the vision care milieu between developed and developing worlds

- However, perhaps not so different

Parallels between developed and developing worlds

- Most of the conditions that affect children's vision are universal

Parallels between developed and developing worlds

- Status of vision care in the US

Summary

- Conditions affecting children's vision are largely universal
- Barriers to care are similar in the developed and developing worlds

Child Self-Refracton Study

- Carried out under the auspices of the Center for Vision in the Developing World at Oxford University
- Carried out in Boston and in urban and rural China
- Goal to determine if self-refraction :
 - Can provide visual acuity comparable to a gold standard
 - Can provide refractive correction comparable to a gold standard

Methods

- Subjects recruited from 38 schools in Boston area
- Van based self refraction and examination
- Self refraction mediated by OD
- Exam by OD masked to results of self refraction

Subjects

- Total 350 subjects
- 12-18 years of age Mean age: 13.75 years
- Male: 152 Female: 198

Inclusion - Exclusion Criteria

- Uncorrected VA of 20/40 or worse in one or both eyes
- Best corrected VA of 20/32 or better in both eyes
- Myopia $\geq -1.00\text{D}$ in one or both eyes, $\leq -7.75\text{D}$ in both eyes
- $\leq -2.25\text{D}$ astigmatism in both eyes
- No amblyopia or strabismus
- No ocular pathologies

Visual Acuity

- 98.72% of 700 eyes obtained 20/32 or better visual acuity

Visual Acuity

- 92.15% of 700 eyes obtained 20/25 or better visual acuity

Visual Acuity

- Of 350 subjects, only 2 (0.571%) subjects could not get 20/32 or better in their better eye

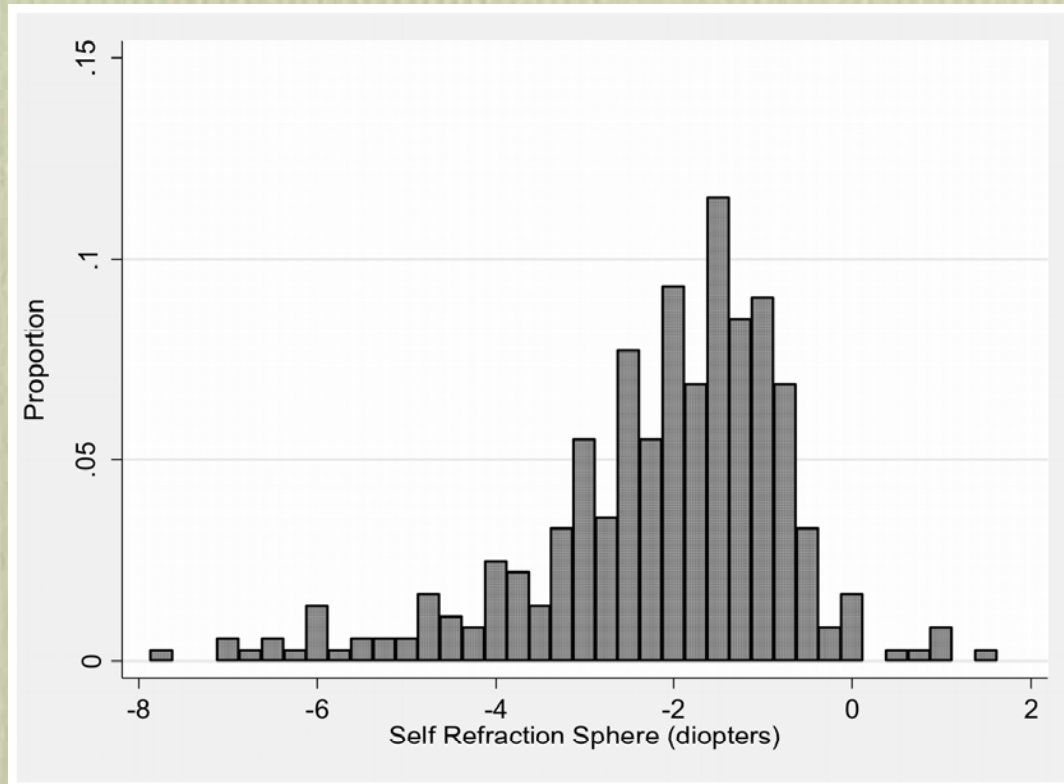
Visual Acuity

- Only 9 eyes (1.28%) of a total of 700 eyes could not get 20/32 or better acuity

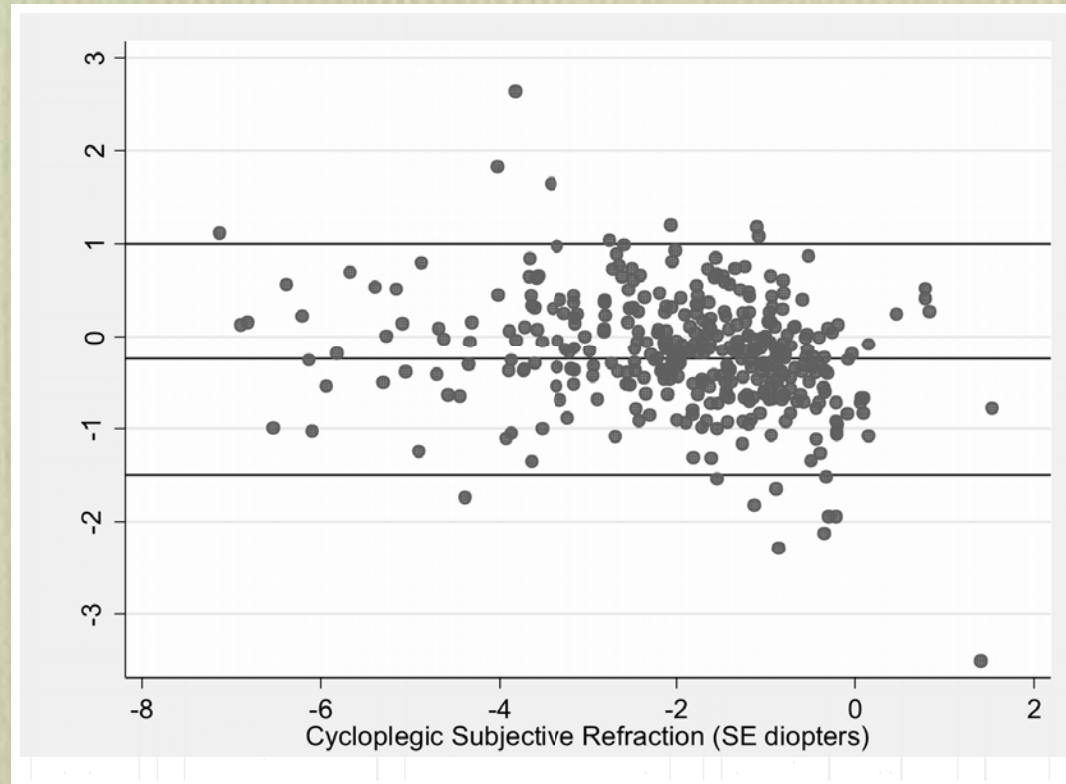
Refraction Results

- Self-Refraction – Cycloplegic Subjective Refraction:
Mean: - 0.23 D Standard deviation: 0.67 D
- Non-cycloplegic Autorefraction – Cycloplegic Subjective Refraction:
Mean: - 0.20 D Standard deviation: 0.30 D

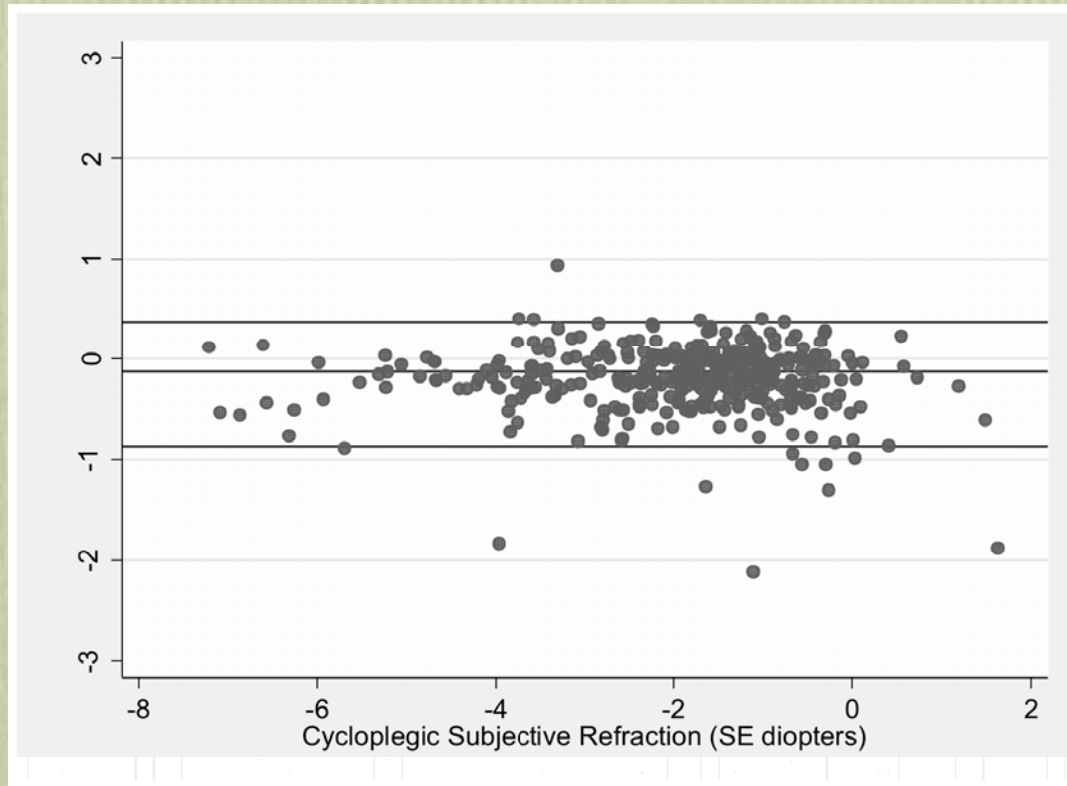
Distribution of spherical equivalent refractive error in the right eye for Boston school children as assessed by self-refraction. Negative values indicate myopia and positive values hyperopia.



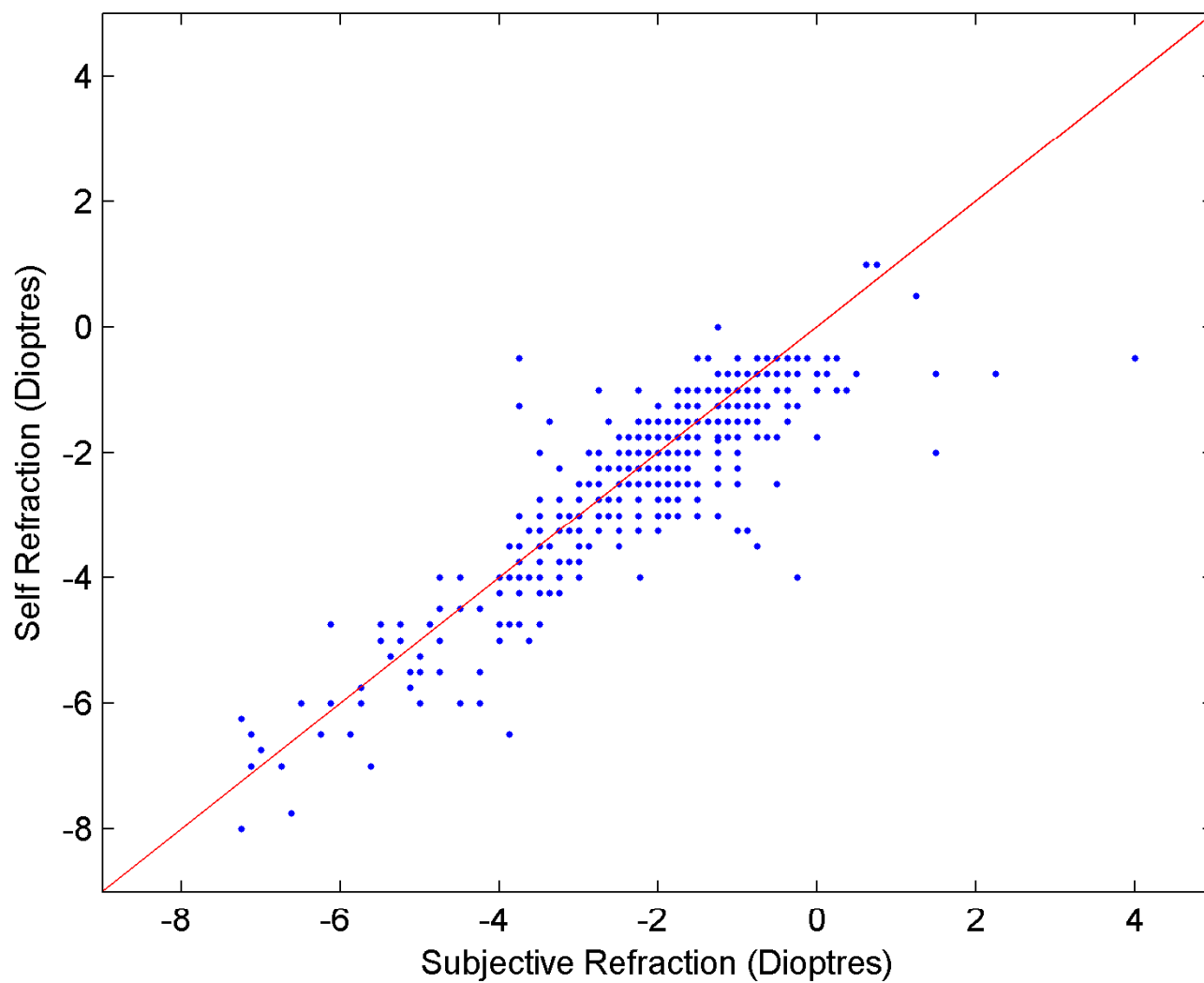
Bland Altman plots comparing cycloplegic subjective refractive error with self-refraction in the right eye. The horizontal lines represent, from top to bottom, the 97.5th percentile, the median and the 2.5th percentile, respectively.



Bland Altman plots comparing cycloplegic subjective refractive error with non-cycloplegic auto-refraction in the right eye. The horizontal lines represent, from top to bottom, the 97.5th percentile, the median and the 2.5th percentile, respectively.



Comparison of Self Refraction with Subjective Refraction



Visual Acuity Results Discussion

- Almost every subject was able to get very good vision through their self refraction
- Very few eyes were unable to obtain good vision through their self refraction

Visual Acuity Results Discussion

- Of those 9 eyes not able to obtain 20/32 or better
 - 4 under-minused, 2 over-minused
 - 3 in close refractive agreement but still had reduced acuity
 - None with cyl between -1.25 to -2.25D had 20/40 or worse

Refraction Results Discussion

- Mean self refraction very close to that of Cycloplegic Subjective Refraction
- Standard deviation, i.e. variation in self refraction quite large

Refraction Results Discussion

- Why the “scatter”?
- What, if anything, can we do to reduce it?

The potential role of self refraction

- as a refracting tool

The potential role of self refraction

- as a treatment tool

The potential role of self refraction

- as a screening tool

The potential role of self refraction

- as an early stage in the development of a system of care

The potential role of self refraction

- as a stimulus to increasing demand by the population to develop a system of vision care

The potential role of self refraction

- What next??

Thanks!

