ITEM POOL SECURITY:

WHAT OPTIONS ARE AVAILABLE

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National Dental Examining Board of Canada

National Dental Examining Board of Canada

- Established by an Act of Parliament in 1952.

- Establish the qualifying conditions for a national standard of competence for general dentists.

- Issue certificates to dentists who successfully meet this standard

- Two components to the overall certification process
  - Written Examination
  - Objectively Structured Clinical Examination

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Written Examination

- Paper and pencil
- Examination is administered three times a year
- 2 to 4 scrambled forms used during each administration
- Item is divided into two sections, 150 items in each
- All items are MCQ
- Passing standard was set in 2008; implemented in 2009, with exams equated back through anchor items

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Written Examination

- Basic science knowledge

- Applied clinical science knowledge

- Diagnosis

- Treatment planning

- Prognosis

- Treatment methods

- Clinical decisions

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Item Release Policy

- Reports that some candidates were attempting to reconstruct the exam.

- Item release policy was adopted in 2009.

- Released approximately 7,000 items (stimulus, stem, response options, but not the key).

  – English and French-Canadian versions

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Research Question & Design

▲ Qualitative elements
  – Focus groups of stakeholders
  – Multiple factors (e.g., curriculum, perception)

▲ Quantitative elements (Phase 1)
  – Stability of form characteristics
  – Item level drift

▲ Quantitative elements (Phase 2, int'l candidates)
  – Stability of form characteristics
  – Item level drift

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Quantitative Analysis–Phase 1

- Form level analysis for 3 years before and after policy implementation
  - Psychometric characteristics
  - Pass rates

- Item level drift analysis
  - All pairwise comparisons
  - Most recent use before and after policy implementation

Quantitative Analysis, Phase 1 Results – Form Analysis & Pass Rates

	Form 2007	Form 2008	Form 2009	Form 2010	Form 2011	Form 2012
Theta at cut score	0.78	0.77	1.01*	1.02	1.12	1.09
Livingston-Lewis Decision Consistency	97.2%	97.5%	94.8%	96.8%	96.6%	96.2%
Coefficient alpha	0.90	0.90	0.92	0.92	0.90	0.88
Pass rate	95.6%	96.7%	90.2%	94.9%	94.9%	95.3%

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Quantitative Analysis, Phase 1 Results – Item Drift Analysis
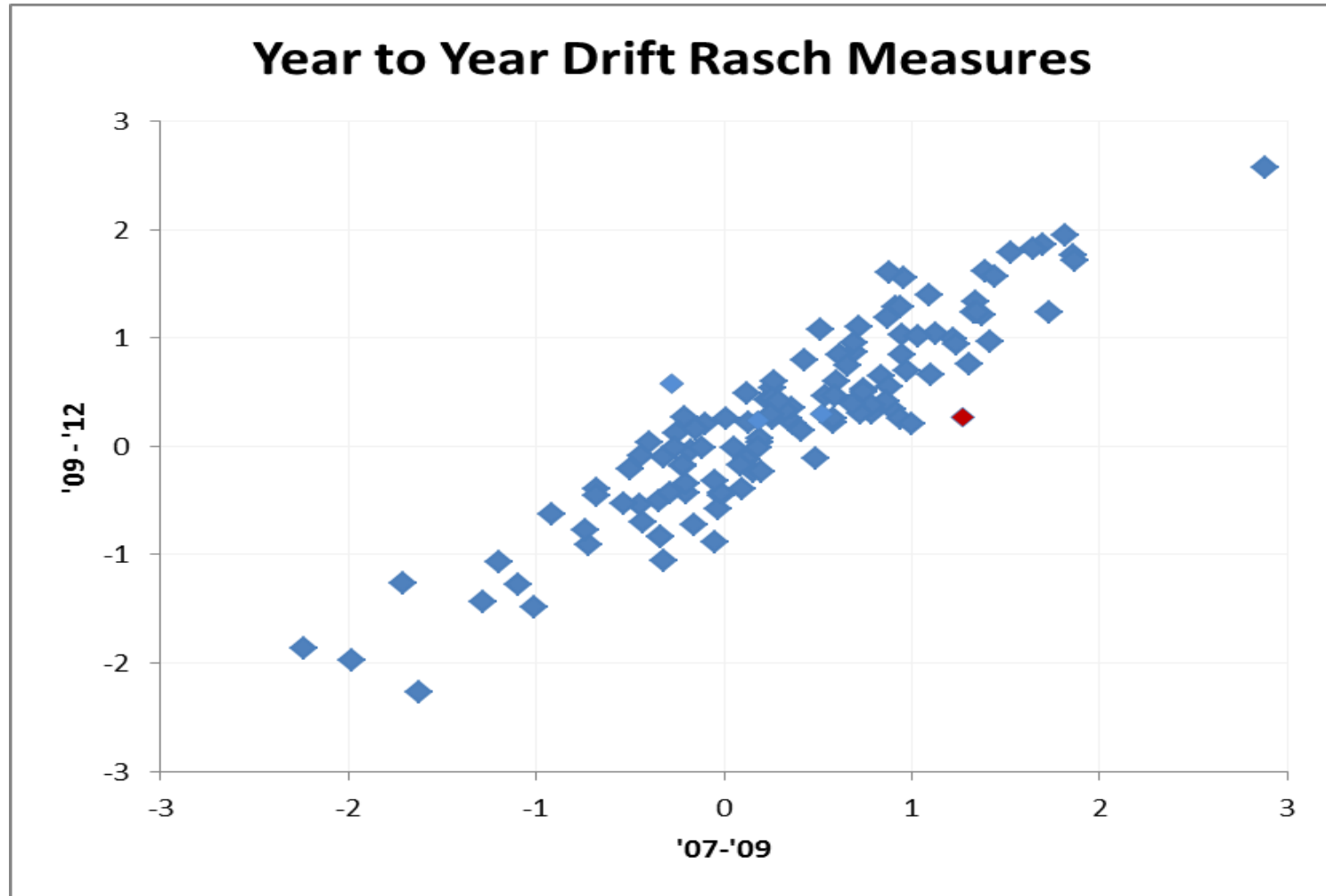
Quantitative Analysis–Phase 2

- Graduates of international (non-accredited dental programs) must successfully complete an accredited Qualifying or Degree Completion Program **OR** the NDEB Equivalency Process prior to being eligible to take the NDEB Written and OSCE Examinations.

- Population of international test takers who complete this process and take the written examination is notably smaller and less stable in performance.

Quantitative Analysis – Phase 2
Form level Analysis

	2011	2012	2013	2014
Theta Cut Score	1.29	1.26	1.22	1.22
Mean % Correct Score	74.4%	66.5%	66.9%	66.80%
Alpha Reliability	0.97	0.96	0.96	0.96
Pass Rate	43.7%	35.8%	42.0%	48.5%
Decision Consistency (Livingston-Lewis)	92.6%	91.1%	91.0%	91.6%

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Quantitative Analysis – Phase 2 Item level Analysis

- Differential item functioning (DIF) was completed to investigate shifts in item difficulty
- 141 items appeared on more than one exam between 2011 and 2014
  - 98 appeared on two exams
  - 8 appeared on three exams
  - 35 appeared on four exams
- 13 items were found with significant differences in difficulty
  - 9 items identified as easier in later administration

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Quantitative Analysis–Phase 2 Item level Analysis

Item Drift for earlier and later test administrations
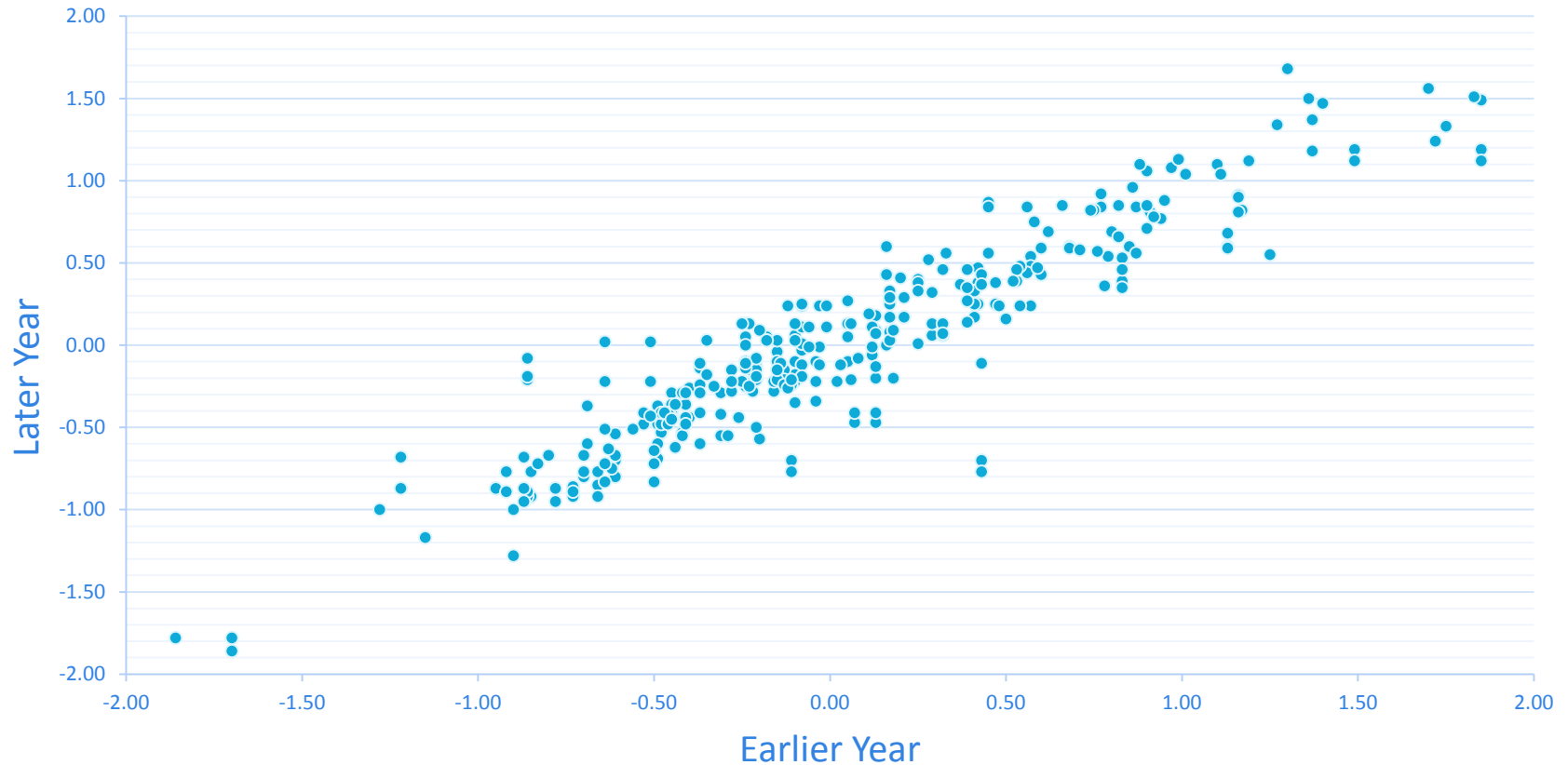
Quantitative Analysis – Phase 2
Items that appeared on all four administrations
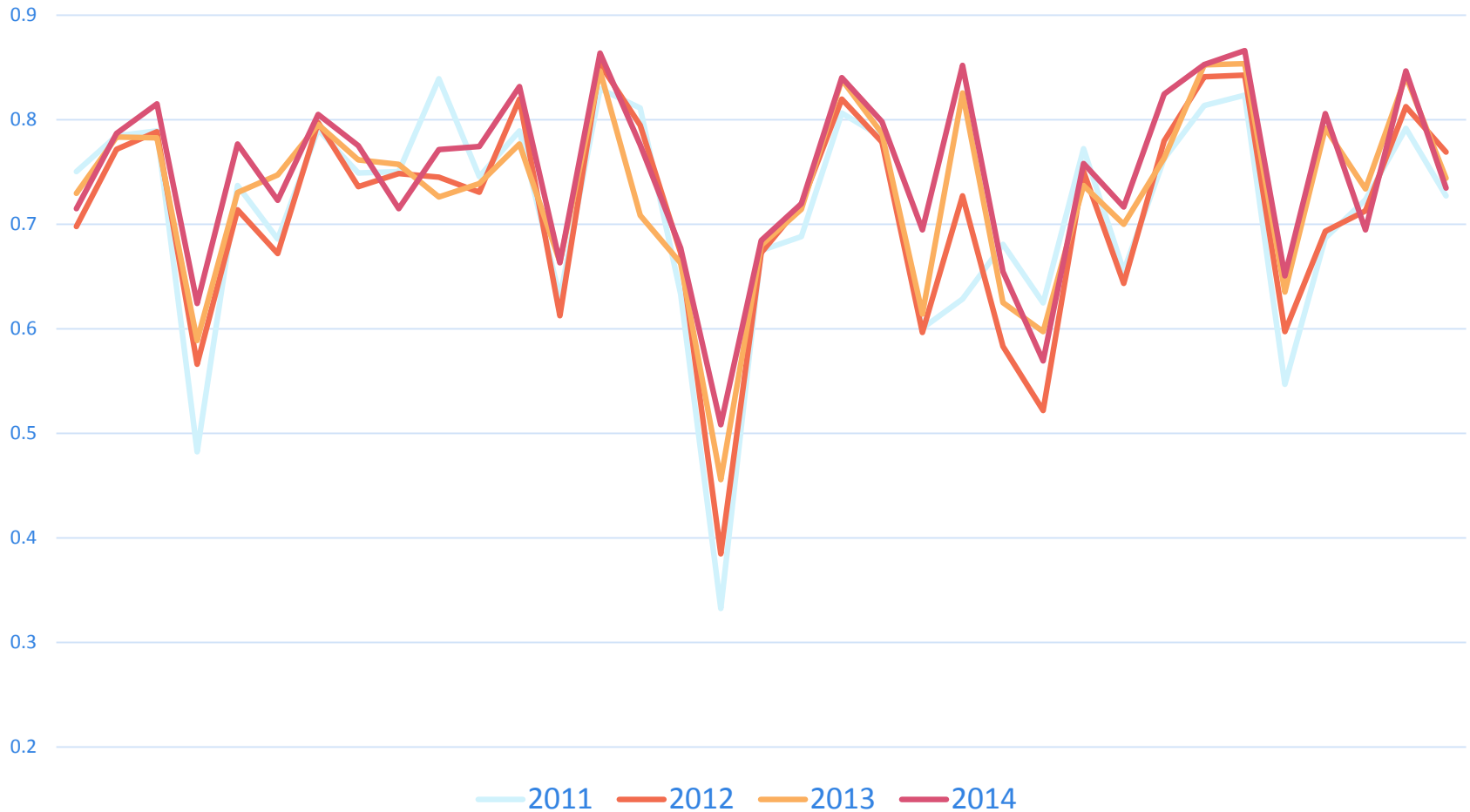
Specific Context/Limitations

- Limitations/Implications for practice
  - Limited administration
  - Large item bank
  - Small sample size

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Conclusions

- **Qualitative**
  - Limited impact on other system elements
  - Positive, intended consequences
- **Quantitative**
  - Form level characteristics appeared to shift after the first year, but then stabilized
  - Individual item drift was fairly limited with both the Canadian candidate population and the international candidate population
  - Most items that appeared on multiple forms did not witness significant shifts in difficulty

Thank you!
Köszönöm!

- Please address any questions to:

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