A Glimpse Behind the Curtains: Item Selection and Test Assembly

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Exam Building Process

- Item Review
- Item Selection
- Evaluation as to expectation of the performance of the item.

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Item Review

- Item Selection is a multi-step process:
- First step is that all of the new questions submitted are reviewed by members of the specific committee.
- Questions are checked for accuracy.
- Suggestions for improvement in wording and any other corrections are made. (Editor's comments noted.)
- Items are classified by category (sub category) and difficulty.
- Also, make sure references are in place.

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Item Review

- The new items are entered into the DATABASE for use on an exam.
- The intent is to have a reasonable percentage of new questions on each exam

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Item Selection

- Members of each specific Exam Committee meet to put the exam together.
- From the previous work, the questions have been placed into a specific category.
- A blueprint exists for each item that dictates the number of questions (Simple and Complex) for a given category.

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Item Selection

- Prior to the meeting, each member selects old and new questions for each category as possibilities.
- At the meeting the ideas for each category are combined and questions are selected.
- Start with previously used questions.
- What constitutes a good question?

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Item Selection

- First, one looks at the P value.
- P-value is the probability that a question was answered correctly among examinees.
  - Ideally would like to have the P-value ~ 70%.
- Also, the performance over the years is checked.
- Questions may be used again after several years have passed.
- Good questions will be consistent performers which helps to add continuity.

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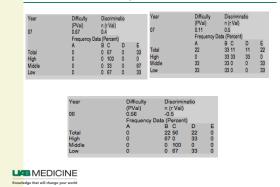### Item Selection

- Next consideration is how well did an item discriminate.
  - This is done using the R-value.
  - The issue is that want each question to assess the knowledge of each individual and separate out those who know the material from those who are lacking knowledge and familiarity.

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R-Value

- If all individuals who performed well on an exam got the question correct and the ones who did not do well, missed the question, the R-value will approach 1.0.
- On the other hand if the lowest scorers get the question correct and the high scorers get it wrong, the R value will be negative.
- The ideal is for the R-value to be positive, of the order of 0.3 is good.
- Of course, one has to note the total number of individuals taking a particular exam.

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Examples of R

Year	Difficulty (PVal)	Discrimination (r Val)				
07	0.67	0.4				
Frequency Data (Percent)		A	B	C	D	E
Total		0	0	67	0	33
High		0	0	100	0	0
Middle		0	0	33	0	67
Low		0	0	67	0	33

Year	Difficulty (PVal)	Discrimination (r Val)				
07	0.11	0.5				
Frequency Data (Percent)		A	B	C	D	E
Total		22	33	11	11	22
High		0	33	33	33	0
Middle		33	33	0	0	33
Low		33	33	0	0	33

Year	Difficulty (PVal)	Discrimination (r Val)				
06	0.56	-0.5				
Frequency Data (Percent)		A	B	C	D	E
Total		0	22	56	22	0
High		0	67	0	33	0
Middle		0	0	100	0	0
Low		0	0	67	33	0

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Item Selection

- Through this process, previously used questions are selected.
- Also, if it is noted that a given item is not performing well (for instance, many are selecting the same wrong answer), then the question may be modified and answers changed.

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Item Review

- New questions are examined and are selected based on the content and that different aspects of a category are covered.
- Next, Pretest items are chosen. Some new questions are chosen as pre-test items. This serves to see how well an item performs if there is doubt that it may be too hard or too easy.
- Also, alternate questions are chosen. Later on in the review process, it may be determined that a particular question may have issues so alternates are available.

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Item Selection

- After the Simple category questions, which are fact based or single step calculations, complex are chosen.
- A similar process is followed, including alternate and pre-test questions.
- It takes about a day-and-a half to do this work.

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Angoff

- After the exam is put together, an evaluation is made of the exam called an Angoff procedure.
- In essence, this involves rating each question by individuals knowledgeable of the material and practicing in the field.
- A question is rated whether a minimally competent individual would get the correct answer.

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Angoff

- For instance, if the group concensus for a given question is 60, then it is felt that 60% of the minimally competent individuals would get the question correct.
- The actual process of using the scoring is based on a developed statistical process.
- The process helps to give an empirical value for the passing score.

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Summary

- The process of putting the exam together involves a number of steps as indicated.
- Each step is designed to sort out the best questions that cover the material.
- As noted previously, it is not easy to write good questions.
- The involvement of a sufficient number of individuals helps to gather different view points and to make the questions better.

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