

QSS 20 Final Project

Analyzing Most Effective Questions from START Initiative Medical Training Data

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Outline

- ▶ Motivation
- ▶ Research Questions
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Motivation

- ▶ Can improve the quality of care provided to IDD patients and ultimately enhance their overall health outcomes.
- ▶ Understand the challenges faced by healthcare professionals when caring for intellectual or developmental disability (IDD) patients
- ▶ At large, begin to inform policy and practice changes aimed at improving care delivery

Research Questions

- ▶ Test whether the correctness of certain questions is a statistically significant means of determining final scores, and what variables may be doing a better or worse job at predicting final scores.
- ▶ How could our results inform creators of the training module omit, extend or add new topics?



Methods: Data cleaning

- ▶ Drop irrelevant columns and rows with NA values
- ▶ Subset to only include the questions with multiple-choice answers

	Q6	Q31	Q34	Q36	Q37	Q39	Q12	Q13	Q22	Q23
2	Personality Disorders, Psychotic Disorders & T...	The person's case manager/service coordinator ...	Asthma	Medical/biological issues should be ruled out ...	Running away	talking to themselves, monologue, having an ima...	Ask your patient exploratory questions, Talk to...	Discipline the person to get them to behave, Ge...	Extensive, long-term behavior modification tre...	lithium, quetiapine, divalproex
6	Depression, Psychotic Disorders, & Schizophrenia	The majority of people with IDD receive care l...	Asthma	Constipation, dental pain and gastroesophageal ...	Withdrawal	Lip smacking	Know that people with the same disability will...	Get a copy of their behavior plan for the next...	Extensive, long-term behavior modification tre...	lithium
8	Bipolar Disorder, Psychotic Disorders, & Traum...	In order to receive IDD services, the person m...	Neurological disorder(s), Pain (ex: dental, ear...	Medical/biological issues should be ruled out ...	Talking to inanimate objects	Auditory hallucinations that are intrusive and...	Ask your patient exploratory questions	Get a copy of their behavior plan for the next...	Extensive, long-term behavior modification tre...	aripiprazole, risperidone
9	Anxiety, Depression, & Trauma-Related Disorders	In order to receive IDD services, the person m...	Neurological disorder(s), Pain (ex: dental, ear...	Medical/biological issues should be ruled out ...	Staring into space	having an imaginary friend, Auditory hallucinat...	Ask your patient exploratory questions, Ask que...	Give the patient the option to wait outside or...	Extensive, long-term behavior modification tre...	risperidone
10	Anxiety, Depression, & Trauma-Related Disorders	In order to receive IDD services, the person m...	Pain (ex: dental, ear), Cardiovascular disease, ...	Medical/biological issues should be ruled out ...	Staring into space	Auditory hallucinations that are intrusive and...	Ask your patient exploratory questions, Ask que...	Get a copy of their behavior plan for the next...	Extensive, long-term behavior modification tre...	lithium, divalproex
11	Anxiety, Depression, & Trauma-Related Disorders	In order to receive IDD services, the person m...	Neurological disorder(s), Cardiovascular diseas...	Medical/biological issues should be ruled out ...	Talking to inanimate objects	Auditory hallucinations that are intrusive and...	Ask your patient exploratory questions, Ask que...	Get a copy of their behavior plan for the next...	Extensive, long-term behavior modification tre...	lithium, divalproex, risperidone
12	Anxiety, Depression, & Trauma-Related Disorders	In order to receive IDD services, the person m...	Neurological disorder(s), Pain (ex: dental, ear...	Medical/biological issues should be ruled out ...	Talking to inanimate objects	Auditory hallucinations that are intrusive and...	Ask your patient exploratory questions	Get a copy of their behavior plan for the next...	Combination treatment, including pharmacothera...	lithium, quetiapine, divalproex, aripiprazole

Methods: Data cleaning

- ▶ The grading was unclear for short-answer questions, and there was no record of how the answers with “Choose all that Apply” were graded
- ▶ Did respondents receive 0's if they chose a wrong answer or were they awarded partial credit in full points. (Ex. Did 2/3 right = 2, 1, 0.66, or 0 points?)
- ▶ We decided to create a function to regrade, but ran into some problems...

Methods: Our Function and Results

- ▶ We created a dictionary of each question with the question, choices, and answers. Using the dictionary, we checked if the question had multiple answers. If it did, then we divided the total correct, by the total number of answers to award partial credit.

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['In order to receive IDD services, the person must have a diagnosed intellectual or developmental disability, and must have impaired adaptive functioning,Medical providers may need to engage family members and other caregivers in the patient's care,The person's case manager/service coordinator from the developmental disabilities service agency could be helpful at medical appointments']
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['In order to receive IDD services, the person must have a diagnosed intellectual or developmental disability, and must have impaired adaptive functioning', "Medical providers may need to engage family members and other caregivers in the patient's care", 'The person's case manager/service coordinator from the developmental disabilities service agency could be helpful at medical appointments']
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Scores

	Q6	Q31	Q34	Q36	Q37	Q39	Q12	Q13	Q22	score
0	1	0.0	1.0	0.0	1	1.0	1.0	0	1.0	4.0
1	0	0.0	1.0	1.0	1	0.0	1.0	0	1.0	4.0
2	1	1.0	1.0	0.8	0	1.0	1.0	1	0.0	4.8
3	0	1.0	0.6	1.0	1	1.0	1.0	1	0.0	4.6
4	0	0.0	0.0	0.0	1	0.0	1.0	1	1.0	2.0
5	1	1.0	0.8	1.0	1	1.0	1.0	0	1.0	5.8
6	1	1.0	1.0	1.0	1	1.0	1.0	0	0.5	5.5
7	0	0.9	1.0	1.0	1	0.0	1.0	1	1.0	4.9
8	0	1.0	0.0	1.0	0	1.0	1.0	1	0.0	4.0
9	1	1.0	0.0	0.0	1	1.0	1.0	0	1.0	4.0
10	1	1.0	1.0	0.9	0	1.0	1.0	0	1.0	5.9
11	0	1.0	0.9	1.0	0	1.0	1.0	1	1.0	5.9
12	1	0.5	1.0	1.0	1	1.0	1.0	1	1.0	5.5
13	0	1.0	1.0	0.8	1	0.8	1.0	1	0.0	4.6
14	0	1.0	1.0	1.0	1	1.0	1.0	1	1.0	6.0
15	1	1.0	0.9	1.0	1	0.0	1.0	1	1.0	4.9
16	1	1.0	1.0	0.0	0	1.0	1.0	0	1.0	5.0
17	0	1.0	0.0	1.0	0	1.0	1.0	1	1.0	5.0
18	0	1.0	1.0	1.0	1	0.7	1.0	0	1.0	5.7
19	1	0.9	1.0	1.0	0	0.0	1.0	1	0.0	3.9

Methods: Running OLS Regression Models

- ▶ Objective: Testing association between answering specific questions correct, our independent variables, and the final score.
- ▶ Test for possible confounding variables that influence the final score (Race, Gender, Age, Primary Language, Experience, and Training)
- ▶ Take the highest correlation coefficient questions and test it alongside the confounding variables above.

Results

Table 1. Ordinary Least Squares Regression Analyses of Pre-Assessment Scores Regressed on Questions Correctness and Confounding Variables

	Model 1 b	Model 2	Model 3
Question 6	0.8959	1.1013	1.1468
Question 31	3.7042*	3.0165	2.6854*
Question 34	1.2052	0.8968*	-
Question 36	-0.9544	-1.5076	-1.8726
Question 37	-0.0135	-0.4787	-
Question 39	-0.0838	-0.2405	-0.0279
Question 12	-1.6271	-1.0005	-
Question 13	0.7076	0.1789	-
Question 22	-1.1481	-1.2478	-1.2065
Male	-	2.4323	1.7244
Female	-	1.2657	0.6307
White	-	2.9564*	3.0988
Asian	-	1.8515	1.7079*
Hispanic	-	0.7414	0.9142
Age	-	-0.5065	-0.4853
Language	-	-0.6036	-0.3078
Experience	-	0.2795	0.2669
Training	-	0.9296	1.0441
Constant			
Adjusted R-Squared			

$p < .05$; * (two-tailed tests)

Results: Regression

- ▶ Built a three-model OLS regression, with results from Question 31 being statistically significant.
- ▶ Indicates knowledge required to answer 31 being necessary to success in the course
- ▶ Race also affects final scores, as being White correlated with increased scores by roughly 3.1 per unit

Limitations

- ▶ Could not track individual respondents across pre and post-assessments. This would have offered greater insights into the efficacy of medical training
- ▶ Extremely limited sample size with N of 79, decreasing confidence of result. Results from the form being optional for correspondents.
- ▶ Limited variety of racial groups across correspondents, with many being White or Asian

Next steps

With our findings we hope to pair these results with literature that supports the correlations and report back to NCSS/UNH and START with areas of focus to improve their medical training, based on questions that have high correlation with overall scores.

Questions for audience feedback

- ▶ Is the dataset well-explained and comprehensible?
- ▶ Do the confounding variables for the OLS regression seem reasonable?
- ▶ Does the methodology seem reasonable and thus reproducible?
- ▶ Does the method for grading short-answer questions seem reasonable?