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Psychometric Testing of the Control-Attitudes Scale-Revised for Patients with a Left Ventricular Assist Device

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Abstract

Background: Perceived control, an indicator of the patient's ability to cope and thrive with a chronic illness, is a common target of nursing interventions. As of 2019, over 25,000 patients had been implanted with a left ventricular assist device (LVAD) as a treatment for advanced heart failure. Patients with an LVAD experience significant life changes that affect anxiety, depression, health-related quality of life and presumably perceived control. To adequately intervene and improve perceived control, a reliable and valid measure is needed.

Objectives: The objectives of this analysis were to: 1) assess item discrimination and anticipated range of scores of the control-attitudes scale-revise (CAS-R); 2) assess internal consistency and validity of the CAS-R; and 3) examine perceived control in a sample of patients with an LVAD.

Methods: Two cohorts of patients with an LVAD (n=113) were combined to evaluate psychometric qualities of the CAS-R. Correlations among patient-reported outcomes and perceived control were used to evaluate validity. Cronbach's alpha was used to test internal consistency. Item-response theory was used to measure item discrimination and anticipated scores. Descriptive statistics describe perceived control in the sample.

Results: Overall, the CAS-R demonstrated good internal consistency and convergent validity with other patient-reported outcomes. Using item-response theory, we saw that the CAS-R was a good predictor of lower-moderate scorers but was not good at differentiating high-performers. There were several items which were poor discriminators and could be altered or discarded to create a more predictive instrument.

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Conclusions: The CAS-R is a valid and reliable instrument to measure perceived control in patients who have an LVAD implants, however, more work could be done to improve item-level information.

Keywords

perceived control; item-response theory; LVAD; Psychometrics; Control-attitudes scale

Introduction

Perceived control is a broadly studied construct that primarily focuses on an individual's perception that they can positively influence outcomes related to stressful situations.[1] In healthcare, perceived control is often linked with the ability to positively cope with a diagnosis and management of chronic disease, particularly heart failure (HF).[2–4] Heart failure is estimated to affect over 8 million people by 2030.[5] To treat advanced HF, many patients receive a left ventricular assist device (LVAD); since the development of these devices, over 25,000 people have received an LVAD and the indications for implantation are increasing.[6]

Patients with an LVAD face much of the same disease burden as those with medically managed HF, however, patients with an LVAD have extremely unique needs related to life with a device. Health related quality of life (HRQOL) is an evolving concept in the LVAD literature; researchers have shown that HRQOL is associated with anxiety and depression in patients with an LVAD, similar to other cardiac populations.[7] In the HF population poor perceived control is related to decreased HRQOL, as well as strongly correlated with anxiety and depressive symptoms.[2,8] In patients with an internal cardioverter defibrillator (ICD) a qualitative analysis revealed that perceived control was the core theme related to psychological adjustment to living with a device.[9] Perceived control is often one of the main targets of nursing interventions, as it is considered modifiable factor.[10,11] Despite understanding the critical role that perceived control plays in similar patient populations, perceived control has never been reported in the LVAD population.

In order to more thoroughly understand the role that perceived control plays, it is critical to have a validated measure to assess it. Currently, the Control Attitudes Scale-Revised (CAS-R) is the primary perceived control assessment scale used in cardiac populations.[11] The purpose of this study was to evaluate the psychometric properties of the CAS-R in the LVAD population. The specific aims were to: 1) assess item discrimination and anticipated range of scores of the CAS-R; 2) assess internal consistency and validity of the CAS-R; and 3) examine perceived control in a sample of patients with an LVAD.

Background

Control Attitudes Scale-Revised

The initial Control Attitudes Scale was created in 1995 by Moser and Dracup due to lack of a validated measure of perceived control in cardiac patients, despite the evidence that showed its' relevance in clinical practice.[10] The initial four-item scale demonstrated good

validity and reliability in several studies of cardiac patients;[10,12] however, the authors found that when a participant did not have a significant support person in their life, the scale had poor reliability.[11] In order to combat this phenomena, the authors revised the initial four-item scale and added components from the Rheumatology Attitudes Scale;[13] this revision and addition developed a 19-item Cardiac Attitudes Index.[11,12] After extensive psychometric evaluations of the 19-item scale, the authors deleted 11 items, leaving the 8-item CAS-R most commonly used in research today.[11,14]

The 8-item CAS-R was validated in a large cohort of various patients with cardiac disease, and was shown to have excellent reliability and validity in over 4,000 participants.[11] The Cronbach's alpha in the sample was greater than 0.7, indicating good reliability.[11] Construct validity of the CAS-R, using convergent validity, was tested by examining the relationship of perceived control to anxiety and depression. In prior studies, those with lower anxiety and depression symptoms had higher levels perceived control.[10,12,15] Validity was confirmed using hypothesis testing of these prior findings, showing in the sample of 4,000 cardiac participants that higher perceived control was associated of lower levels of anxiety and depressive symptoms.[11]

To our knowledge, perceived control has not been measured and reported in the LVAD population. As the LVAD population continues to increase in number, it is crucial to understand the role that control plays in the HRQOL of these patients. In a systematic review of the literature related to quality of life with an LVAD, authors found that QOL is not well understood due to limitations of our current instruments to measure this concept.[16] One finding that was consistent in this review was that adaptation to device management was a difficult process and that this process takes significant emotional and physical adaptation.[16] Additionally in the LVAD population, levels of depression and anxiety are higher than in the general population, similar to that of other chronic disease states.[17] However, we do not know the role that perceived control may contribute or if there is an accurate measure of this concept in this population.

Item Response Theory

While classical test theory has been the gold-standard of psychometric testing,[18] item-response theory (IRT) offers a different perspective. Classical test theory has traditionally focused on the scale-level evaluation of reliability and validity.[18] Item response theory alternatively examines the scale at the individual-item level, which creates the ability for a more refined overall scale and ideally a more predictive, precise scale.[19]

IRT evaluates an items ability to discriminate on 'performance' of a specific trait.[20] For example, when using IRT to evaluate the CAS-R, we sought to examine each item's specific ability to identify whether the participant would have higher or lower perceived control (the specific trait measured by the CAS-R). This is determined in IRT using item characteristic curves as a visual representation of discrimination, using slopes and location along the x-axis, as well as quantitatively using discrimination statistics with p-values.[21]

IRT also allows for researchers to determine how much each item contributes to the scale, or how much 'information' is provided by each item.[20] This permits researchers to determine if

an item is contributing to the overall scale on a smaller or larger level. This function could lead to item-removal if the item only contributes a small amount of information related to the scale. IRT generates item information functions to visually represent this concept.[21]

IRT also provides scale level data by summating information curves to create a test characteristic curve.[21] This graph visually represents the expected scores on the overall scale. Another scale-level function generated in the test information curve. The graphic visually represents the scales overall ability to precisely estimate the trait at varying levels of that specific trait.[20] For example, a scale may be very reliable at predicting people who are higher performers (or high-scorers), but a poor job at predicting people who score average or low on a scale (lower performers).

Methods

In this secondary analysis of 130 patients with an LVAD, perceived control, depressive symptoms anxiety symptoms, and health-related quality of life (HR-QOL) were measured. This sample comes from two cohorts of patients; a larger prospective research study whose methods are described elsewhere,[22] and a cross-sectional study. Data from the cross-sectional study came from a single-institution and had a cross-sectional correlational design. Patients with an LVAD were invited to participate if they met the following inclusion criteria: 1) LVAD implanted for the treatment of end-stage heart failure; 2) LVAD had been implanted for at least 30 days prior to enrollment in the study; 3) able to complete a three-question cognition assessment; and 4) able to read and write in English. Participants were excluded if they were less than 18 years of age or living in institutional setting or nursing home. In order to have a larger sample size and due to collection of the same patient-reported outcomes the data from both samples were combined into a single cohort. In both samples, sociodemographic data was collected through self-report and inspection of the medical record. Institutional review approval was obtained for both studies, and all participants gave written informed consent.

Measures

Control Attitudes Scale-Revised—The 8-item measure (Figure 1) was completed by each participant individually. The total score ranges from 8–40, with lower scores indicating lower levels of perceived control.[11] Each scale item is rated on a 5-point Likert scale, with 1 being *totally disagree,* and 5 being *totally agree*. Item numbers 5 and 8 are reverse coded. The instrument is typically completed in less than 2 minutes and is between a fourth and fifth grade reading level.[10]

Patient Health Questionnaire-9—Depressive symptoms were measured using the Patient Health Questionnaire-9 (PHQ-9), which consists of nine items. Each item corresponds to one of the nine symptoms of the major depressive disorder criteria of the Diagnostic and Statistical Manual of Mental Disorders-IV. Patients rated items based on how often they experienced these symptoms over two weeks on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). The scores are totaled and can range from 0 to 27. Higher scores on the PHQ-9 indicate higher levels of depressive symptoms. The reliability and validity of the PHQ-9 has been demonstrated extensively in a number of populations

as a screening instrument for depression and a measure of depressive symptoms among those at risk for or with cardiac disease.[23–25] The PHQ-9 had demonstrated high specificity and predictive value in relationship with other clinical measures of depression.[23–25] In this sample of LVAD patients the Cronbach's alpha was 0.845, indicating good internal consistency.

Brief Symptom Inventory Anxiety Subscale—Anxiety symptoms were measured using the Brief Symptom Inventory (BSI) anxiety subscale. This is a 6-item subscale is used to measure the intensity of anxiety symptoms over the past 7 days.[26] The items are scored on a 5-point Likert scale from 0 (not at all distressed) to 4 (extremely distressed). The total sum of scores range from 0 to 24, with higher scores indicating higher levels of anxiety symptoms. In this sample of LVAD patients the Cronbach's alpha was 0.840, indicating good internal consistency.

EuroQol Five-Dimensional Questionnaire—Health-related quality of life was measured using the EuroQol Five-Dimensional (EQ-5D) scale. This scale measures five dimensions of health including, mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.[27] Participants rank their perceived health state in each dimension as levels one, two, or three, with level one being no problems with that dimension, level two having some problems, and level three having a lot of problems.[27] For the purpose of this analysis, scores were summed 5–15, with 5 being very good health-related quality of life, and 15 being the worst possible quality of life. In this sample of LVAD patient's the Cronbach's alpha was 0.6194, indicating adequate internal consistency.

Data Analysis

All statistical analyses were conducted using Stata version 16. Frequencies and percentages, median and 25th, and 75th percentiles, or mean and standard deviations were used to describe the sample. The two cohorts were divided based on original study type and compared. Independent t-tests and chi-square tests were used to test for differences between the cohorts. A probability value of less than 0.05 was considered to be statistically significant. Based on established criteria in psychometric testing, prior to conducting this analysis a requirement of 10 to 20 cases per item was determined to be necessary to have stable, replicable psychometric results.[28]

Item Response Theory—To complete the analysis, based on recommendations from the literature, a graded-response model method of IRT was utilized.[21] This model is an extension of the 2PL model, when the items are ordinal and categorical in nature.

Item Discrimination & Anticipated Scores—Item response theory was used to evaluate the precision with which the CAS-R is able to measure perceived control across different levels of perceived control.[29] Item-level and scale-level discrimination can be interpreted as a measure of scale precision. Item-level discrimination will help determine the degree to which an item can predict whether a person will be a higher performer, indicating a person with higher perceived control, versus, a lower score, indicating worse perceived control. We can visually see this through item information curve graphs of discrimination

at the individual item-level, and as a whole measure. The test characteristic curve is used to predict the anticipated score of a person based on information from the sample.

Reliability—Internal consistency reliability was assessed using Cronbach's alpha. A coefficient of greater than 0.7 is considered acceptable internal consistency reliability, a score of 0.8 is considered good internal consistency.[21]

Validity—Convergent validity was assessed using Pearson's correlation coefficients. Total scores from the PHQ-9 and BSI anxiety scales were correlated with total scores from the CAS-R.

Results

Table 1 describes demographic data and patient-reported outcomes of the total sample and comparisons between the two cohorts used in this analysis. The average age of the sample was 54 years. Most participants were male (80%), which is consistent with the LVAD population as a whole. Overall, the mean score on the CASR was 30, which indicates high levels of perceived control. The longitudinal cohort had higher levels of perceived control than the cross-sectional participants. Depressive symptoms were low in the sample at large, but were slightly higher in the cross-sectional cohort compared to the longitudinal cohort. Anxiety symptoms were also low overall, and there were no differences between the cohorts. HR-QOL scores, as measured by the EQ-5D, were comparable between the cohorts. The longitudinal cohort had measurements of patient-reported outcomes at the 6-month time point. In the cross-sectional sample, median LVAD implantation was 503 days, with an interquartile range of 210 and 996 days.

Reliability

Cronbach's alpha of the CAS-R was 0.879, indicating good internal consistency. The inter-item correlation coefficients were less than 0.8 indicating little to no redundancy among the items. All correlation coefficients were greater than 0.2, indicating that the items were related to one another.

Validity

Pearson's correlation coefficients were used to compare depressive symptoms and anxiety with perceived control (Table 2). There was a moderate-to-strong correlation (−0.510, p-value <0.001), between depressive symptoms and perceived control. This indicated that lower levels of depressive symptoms were associated with better perceived control. There was a moderate correlation (−0.412, p-value <0.001) between anxiety symptoms and perceived control. This demonstrated that lower levels of anxiety were associated with better perceived control. Lastly, there was a moderate-to-strong negative correlation between HR-QOL and perceived control (−0.512, p-value < 0.001), indicating that better HR-QOL is associated with better perceived control. There was no association between age and perceived control in this cohort of participants.

Item-Discrimination and Anticipated Scores

Using Item-Response Theory, individual item-level discrimination was evaluated using item characteristic curves. By visually evaluating item-level graphs (Appendix A, Figures 4–12) we determined that in general, the CAS-R can discriminate lower-performing individuals more accurately than higher-performing individuals. In these graphs ▯ represents the attribute of perceived control, whereas negative standard deviations indicate lower perceived control, and positive indicate higher perceived control. Each line represents the probability of a participant choosing a specific answer choice along the continuum of perceived control. A probability greater than 0.5, would be considered a good item-choice discriminator. These graphs show that while more extreme answer choices such as one (strongly disagree) and five (strongly agree) have higher predictive power of overall lower and higher scorers respectively, item choices two through four, are less able to discriminate effectively.

Figure 1 plots the item-information functions. Using the item information functions, we see that individually, many items performed poorly as predictors for overall perceived control. Items two and six had bimodal distributions, indicating that while they may be good predictors of whether a patient will have high or low perceived control, they overall do a poor job of discriminating between those with average perceived control. Other items, including items three, four, five, and eight have flat distributions, indicating that they will tell us little overall about an individual's score. Items one and seven do a moderate job at discriminating high and low scores, however, there are still some fluctuations in their distributions, indicating a lack of precision.

Also illustrated in Figure 1 is a large blank space seen in the right side of the graph. The blank space indicates that these items have limited ability to discern high-scoring participants effectively. However, this scale is effective at identifying lower scorers.

Figure 2 shows the test information curve. This graph is most related to reliability and ability to discriminate between different levels of theta. For the CAS-R we see that the scale overall accurately predicts those between −3 and −1 theta, or lower scorers. There is a slight dip, between −1 and 0, indicating that it may have some difficulty predicting those average scorers, but then rises again from 0 to 1. There is a large drop off after 1 theta, again demonstrating that this scale does a poor job at predicting higher scorers.

Figure 3 shows the test characteristic curve. Using the test characteristic curve to determine anticipated scores, we see most of the sample have expected scores between 17.8–39.3, with a mean score of 31.1. Overall, scores were much more likely to be on the high end of the scale, indicating higher perceived control. This distribution also indicates, that while the scale does a poor job of predicting the higher scorers, it does an acceptable job predicting lower scores, as indicated by the distribution curve below the mean score.

Discussion

Using traditional scale-level psychometric statistics, the CAS-R is a reliable and valid scale to measure perceived control. The Cronbach's alpha was at the higher end, the scale had concurrent validity with other behavioral patient reported outcomes, such as anxiety

and depressive symptoms, and had overall good validity statistics as seen in other studies completed using this scale.[11,12]

However, when using item-level statistics, by using item-response theory, we see that there are several improvements that could be made to this scale. The CAS-R does a poor job of identifying higher-performing individuals, however, does an acceptable job for low-to moderate performers. To address this, it may be worth considering adding a question that would help elucidate what participants feel gives them the most control over their lives. This would require evaluating the literature to identify what populations have high levels of perceived control and attempt to discern a specific characteristic that may be measurable and applicable to this population.

Another option to improve discrimination of higher-performing individuals would be to eliminate some redundancy that is present in some of the items. Items three, four, five, and eight have the flattest item information curves, indicating they tell us little about how the individual will perform based on their responses to these questions. The authors of the scale could evaluate if re-wording a particular question or replacing a conceptual theme of a question with something more informative would be appropriate and explain more about those people who identify as higher-control individuals.

A possible modification of the CAS-R is removal of question three. Question three was chosen specifically because it specifically was less elucidative about overall scores than other questions, as seen by the flat item information line in Figure 1. Removal of question three could lead to a more refined, shorter scale, without losing any of it’s predictive properties.

There are also two questions, items two and six which have bi-modal distributions on the item-information functions. These questions may be more accurate as a yes/no type question, or removing the neutral options, to help with make these questions more informative. This is also seen in the item-characteristic curves; it may be beneficial to test all items as yes/no, or eliminate more of the middle-ground by giving participants three answer choices instead of five.

While continuous improvement on all patient-reported outcome measurements is crucial, this scale is an extremely valuable asset in targeting interventions for patients with an LVAD. In other populations, especially populations with a cardiac device, we see the important role that perceived control plays in positive outcomes,[4,9,10,13] however, we have not yet been able to observe this phenomenon in the LVAD population. Moving forward with a reliable and valid scale as a whole and at the individual level will help clinicians and researchers more accurately identify what role perceived control plays in patients with an LVAD. Improving perceived control would ideally be a target for interventions that can improve quality of life and broaden our understanding of what life with a device truly entails.

Limitations

As with all studies, there are strengths and limitations to this research. The sample size is small, however, it is substantial for research completed with patients with an LVAD. Also,

this is a secondary analysis, so not all validity metrics were available; there may be others that are important in understanding convergence and divergence. Lastly, a limitation is that by combining two different cohorts of participants could cause some statistical analysis uncertainty due to the difference between the data collection of the studies. A strength is that item-response theory to unveil areas of continued recalibration and refinement that may be necessary. Also, perceived control is a well characterized construct in heart failure and can now be thoroughly evaluated in patients with an LVAD.

Conclusion

This study demonstrates that the CAS-R while a valid and reliable instrument for measuring perceived control in the LVAD population, can still be improved at the item-level. More testing and research are needed to continue to refine this scale, and to see if the phenomena that was observed in the LVAD population is also occurring in the larger populations of cardiac patients.

Appendix A.: Individual Item Characteristic Curves

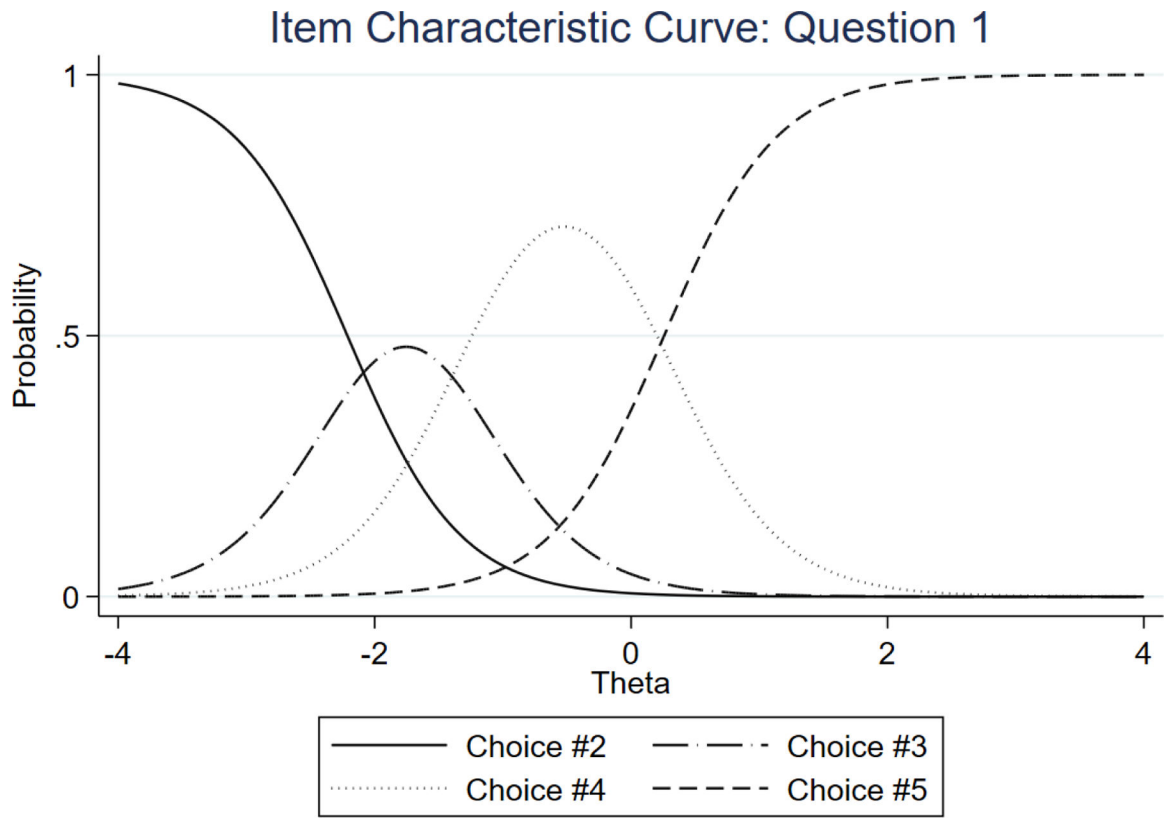

Figure 5.
Item Characteristic Curve for Question #1. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

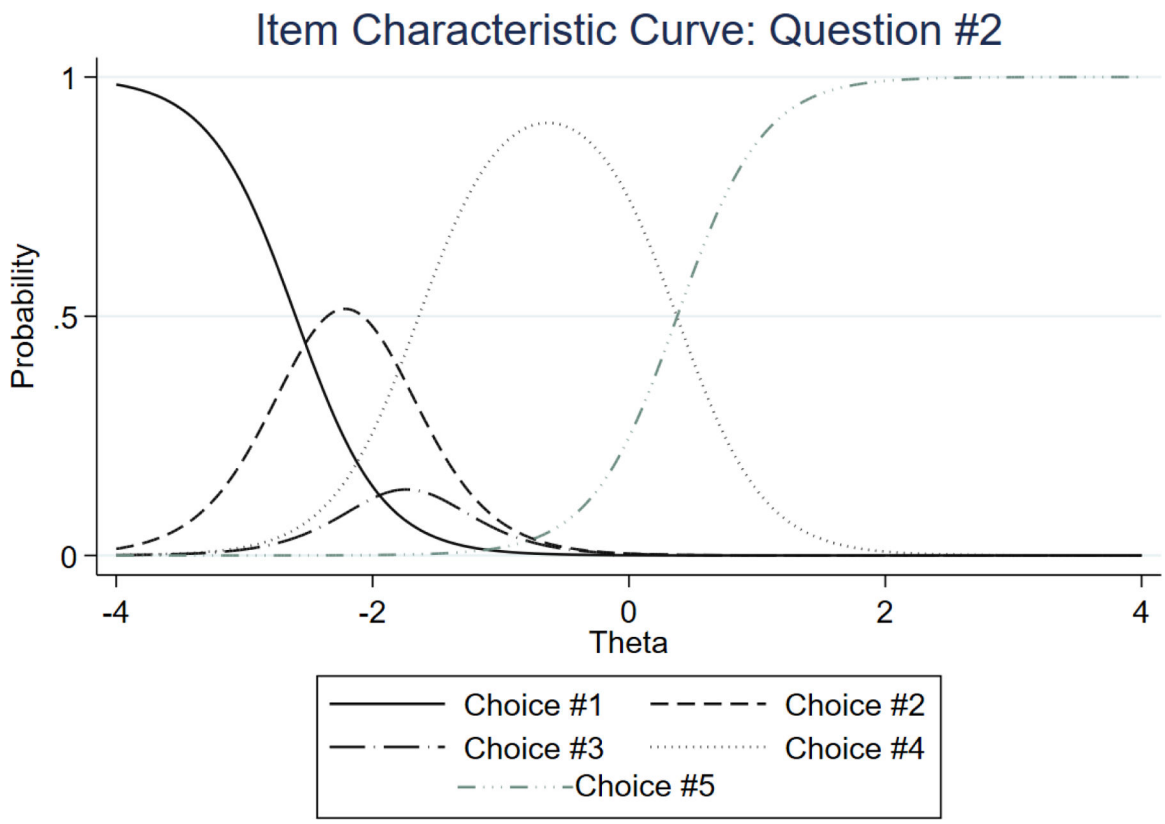

Figure 6.

Item Characteristic Curve for Question #2. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

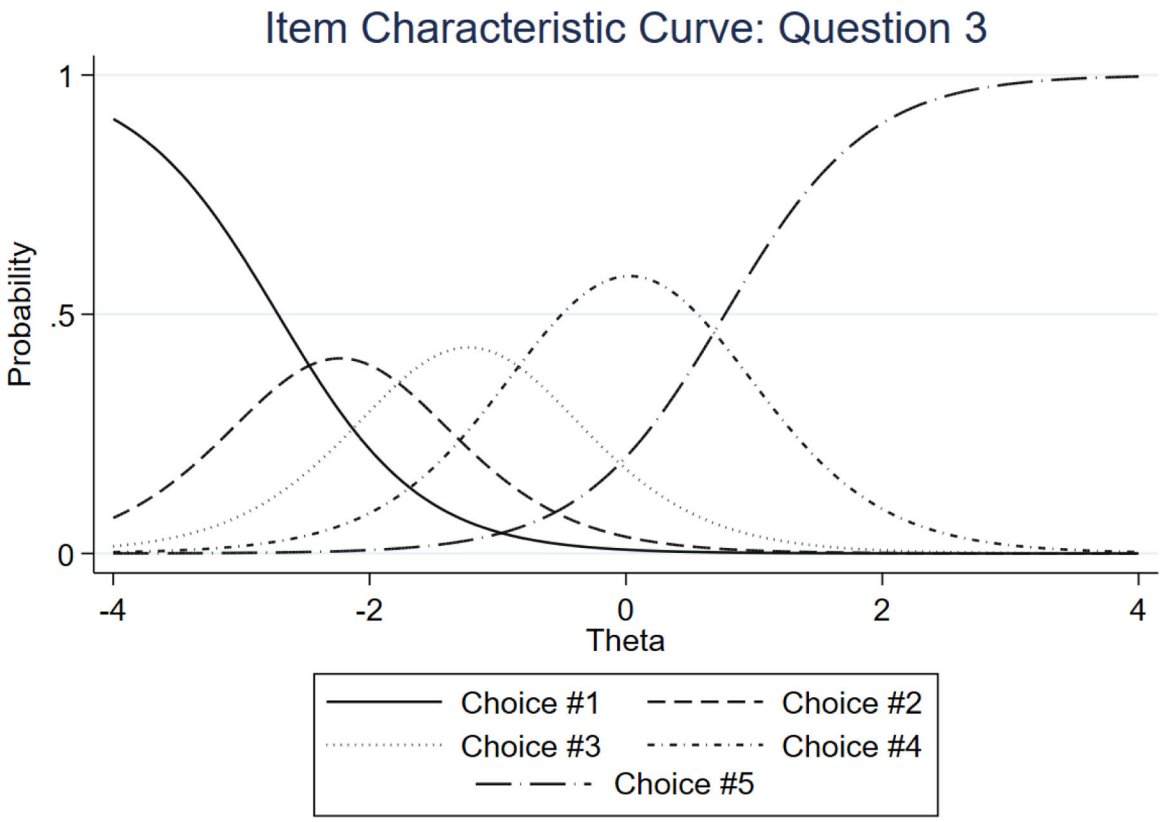

Figure 7.

Item Characteristic Curve for Question #3. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

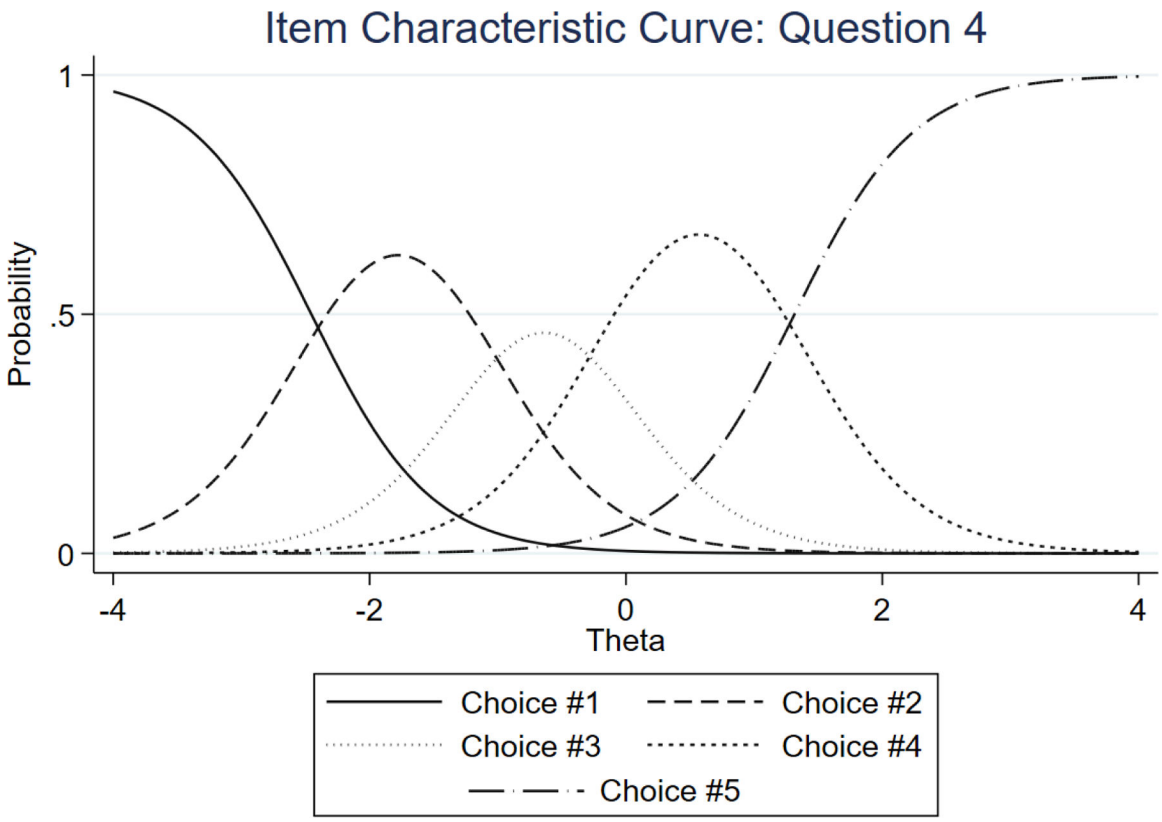

Figure 8.

Item Characteristic Curve for Question #4. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

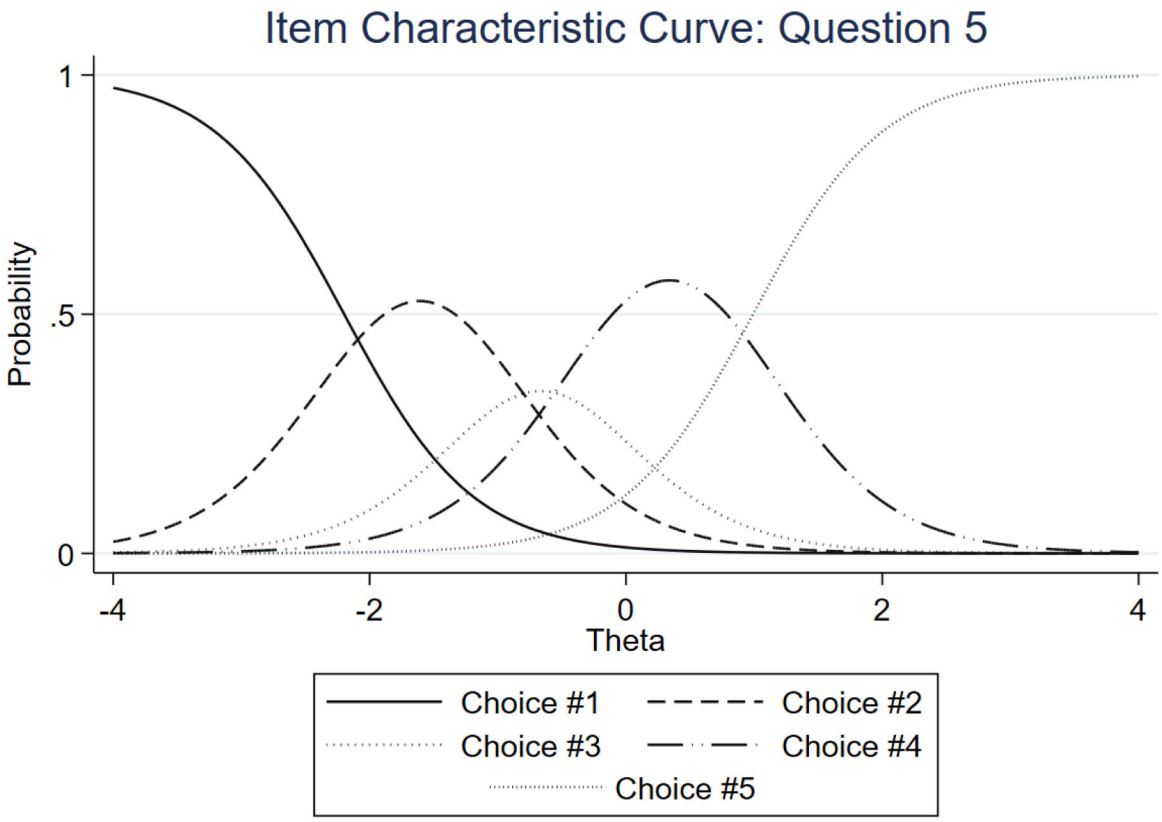

Figure 9.

Item Characteristic Curve for Question #5. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

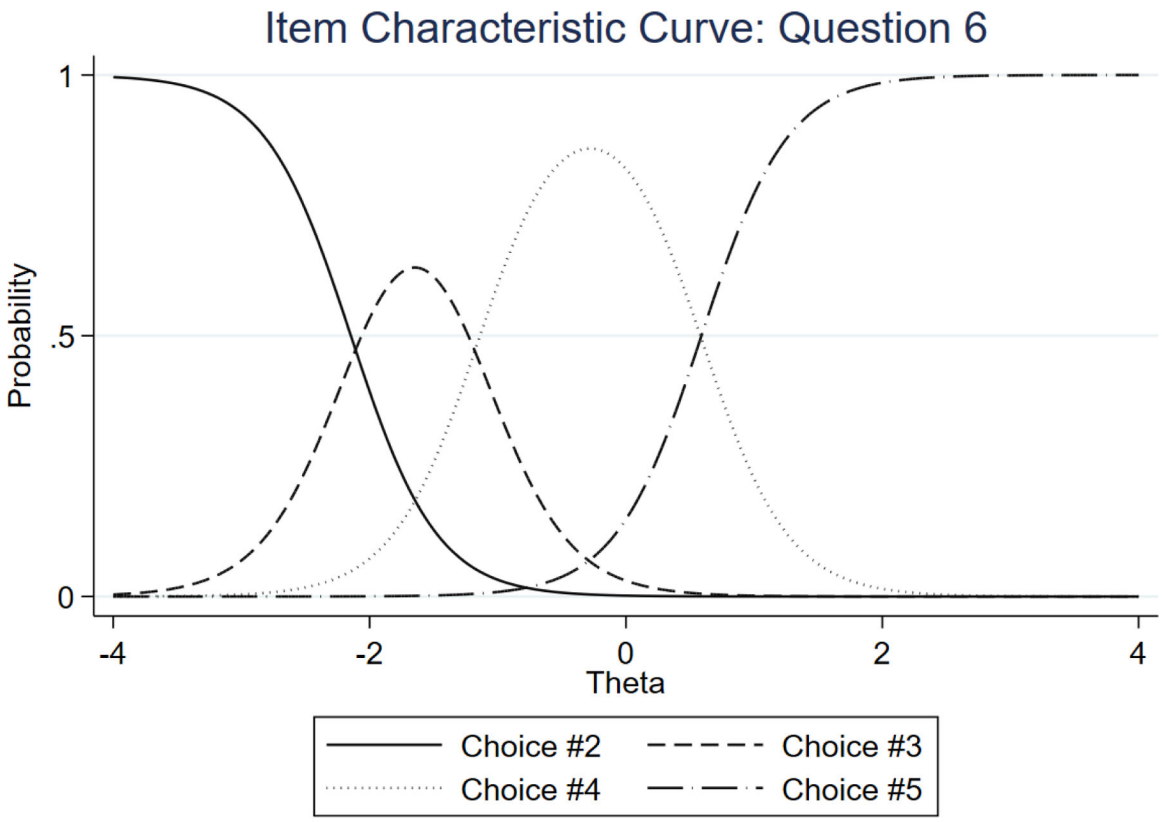

Figure 10.

Item Characteristic Curve for Question #6. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

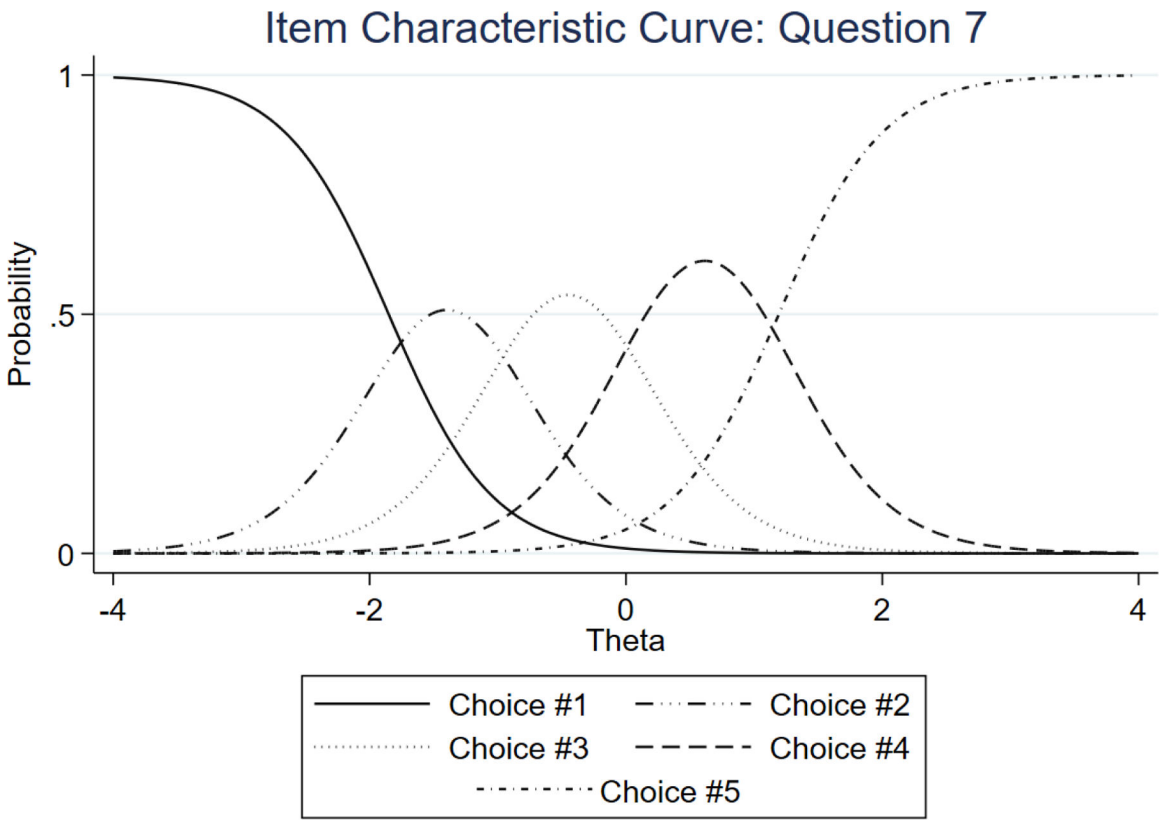

Figure 11.

Item Characteristic Curve for Question #7. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

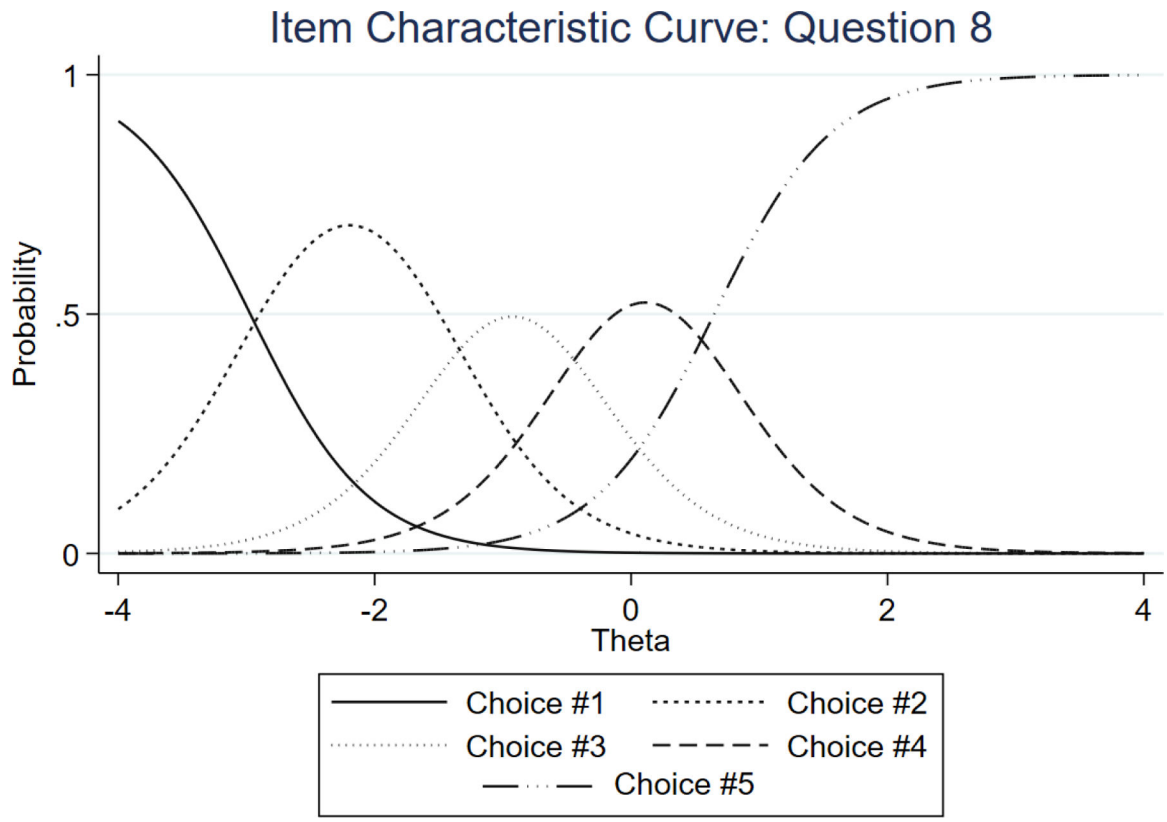

Figure 12.

Item Characteristic Curve for Question #8. This figure demonstrates the probability of overall score (Theta 0 being the mean score of 31.1), as determined by individual item choice.

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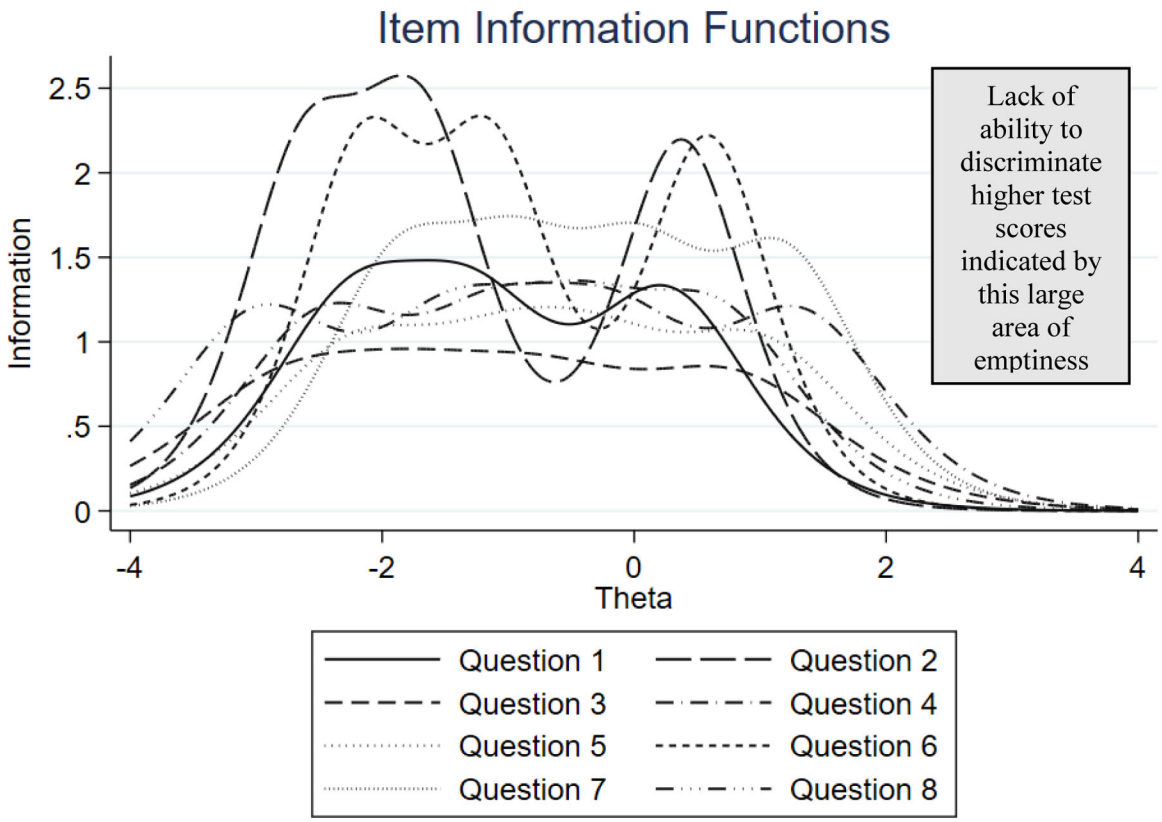

Figure 1.

Item-Level Information Functions of the Control Attitudes Scale-Revised. The X-axis represents average scores, with 0 theta, being the mean score of the sample 31.1; −2 and −4 indicating lower scores, being 2 and 4 standard deviations below the mean. The 2 and 4 to the right of theta are indicative of how well the questions predict higher scorers, with 2 and 4 standard deviations above the mean.

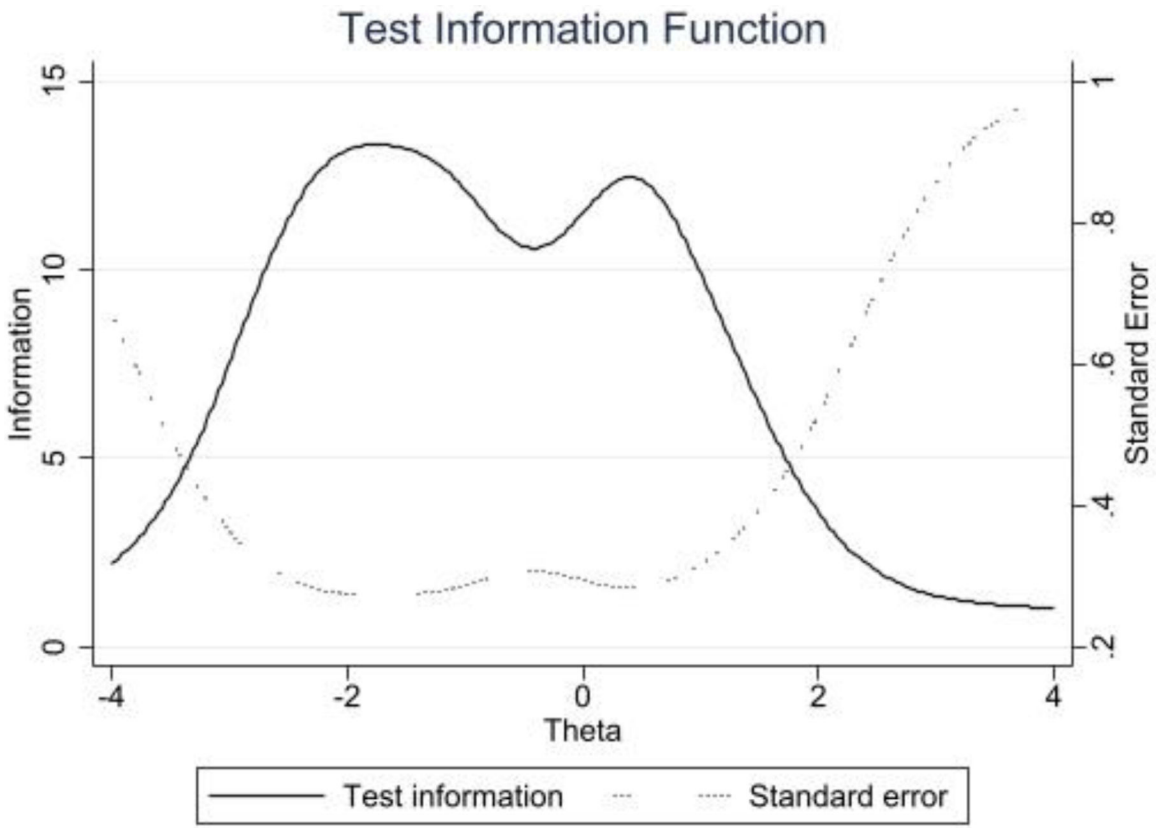

Figure 2.

Test information functions demonstrate the reliability and precision of the scale as a whole. Negative thetas indicate lower scores; this scale is a high predictor of lower scores, as seen by the height of the test information line, and lower standard errors. The dramatic dip at +1 theta is indicative off a significant drop-off in reliability and precision of predicting higher scorers on this scale.

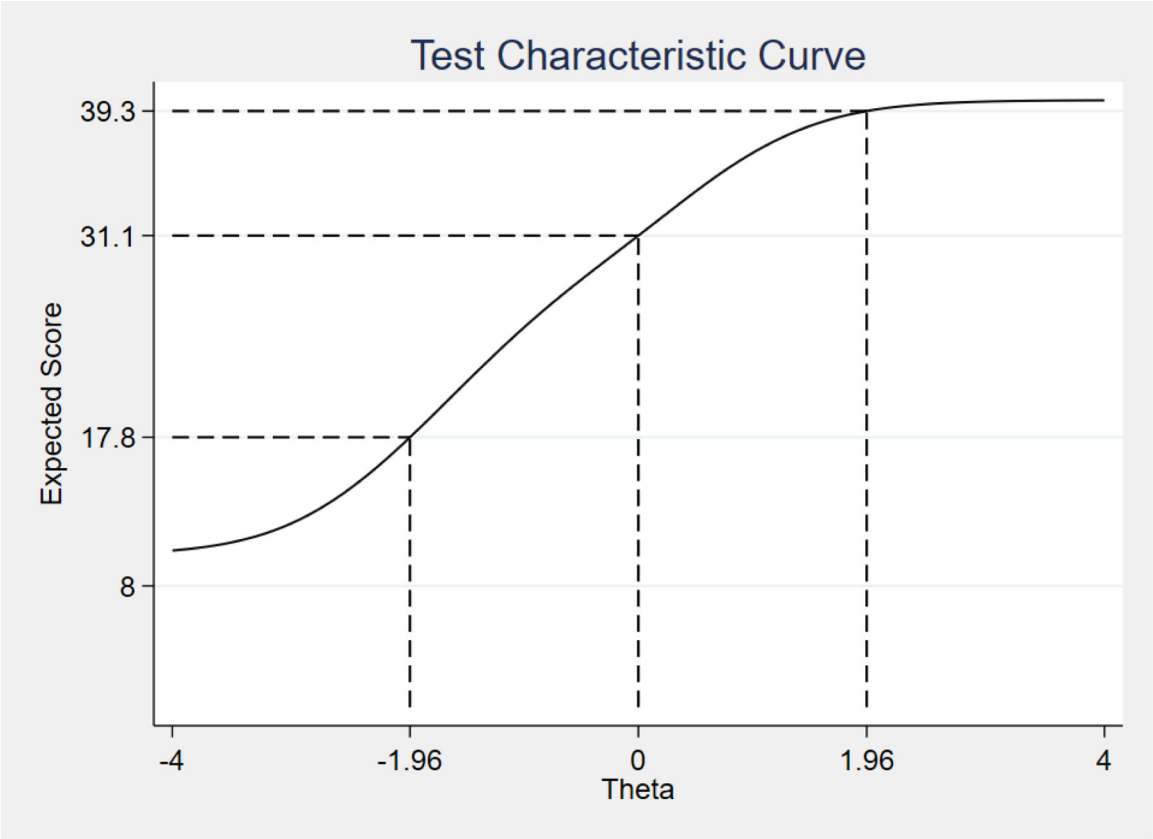

Figure 3.
Expected Scores for the Control Attitudes Scale-Revised; range of scores is 8–40, 0 theta indicates the mean expected score for the sample, which is 31.1.

The Control Attitudes Scale-Revised
1. If I do all the right things, I can successfully manage my heart condition
2. I can do a lot of things myself to cope with my heart conditions
3. When I mange my personal life well, my heart condition does not bother me as much
4. I have considerable ability to control my symptoms
5. No matter what I do, or how hard I try, I just can't seem to get relief from my symptoms*
6. I am coping effectively with my heart condition
7. Regarding my heart problems, I feel lots of control
8. Regarding my heart problems, I feel helpless*
Legend: * reverse coded

Figure 4.
Control Attitudes Scale-Revised

Table 1.

Participant Characteristics, N= 113

	All Participants, Mean±SDor n (%)	Prospective Cohort Participants (n=84)	Cross-sectional Cohort Participants (n=29)	p-value
Age (years) (n=130) [t]	54 ± 15	53 ± 14	57 ± 16	0.269
Gender (male) (n=130) [*]	104 (80)	81 (80)	23 (79)	0.916
CAS-R total score [t]	30 ± 6	31 ± 5	27 ± 5	0.002
PHQ-9 total score [t]	5 ± 5	4 ± 4	7 ± 6	0.019
EQ-5D total score [t]	8 ± 2	8 ± 2	7 ± 2	0.889
BSI Anxiety Subscale total score [t]	3 ± 4	2 ± 3	4 ± 4	0.081
Length of LVAD therapy [*] (days)			503 [210,996]	

Legend CAS-R: Control Attitudes Scale-Revised; PHQ-9: Patient Health Questionnaire-9; BSI: Brief Symptom Inventory; EQ5-D: European Quality of Life Scale, 5 Dimensional

[*]: data reported as mean, and 25th, 75th interquartile ranges.

Superscript [t] indicate a t-test for unequal variances was utilized for analysis

superscript * used to indicate chi-squared used.

Table 2:

Correlations Between Perceived Control Measured with the CAS-R, Depressive and Anxiety Symptoms (N=113)

	Pearson's Correlation	P-value
Age	0.136	0.151
PHQ-9	−0.510	<0.001
BSI Anxiety	−0.412	<0.001
EQ-5D	−0.512	<0.001

Legend CAS-R: Control Attitudes Scale-Revised; PHQ-9: Patient Health Questionnaire-9; BSI: Brief Symptom Inventory; EQ5-D: European Quality of Life Scale.

Table 3:

Average Item Scores, Proportions, and Item-level Discrimination on the CAS-R

	Mean Score ± SD	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Item-level Discrimination Coefficient Statistics
Question 1	4.22 ± 0.78	4(3.54)	0	12(10.62)	52(46.02)	45(39.82)	2.277 SE= 0.447 p <0.001
Question 2	4.23 ± 0.73	1(0.88)	4(3.54)	2(1.77)	67(59.29)	39(34.51)	2.961 SE= 0.618 p<0.001
Question 3	3.81 ± 1.00	3(2.65)	9(7.96)	24(21.24)	47(41.59)	30(26.55)	1.783 SE= 0.321 p<0.001
Question 4	3.44 ± 1.03	3(2.65)	20(17.70)	31(27.43)	42(35.17)	17(15.04)	2.158 SE= 0.369 p<0.001
Question 5*	3.49 ± 1.15	5(4.39)	21(18.42)	25(21.93)	39(24.21)	24(21.05)	1.992 SE= 0.354 p<0.001
Question 6	4.10 ± 0.72	0	3(2.65)	15(13.27)	63(55.75)	32(28.32)	2.973 SE= 0.578 p<0.001
Question 7	3.32 ± 1.12	7(6.19)	19(16.81)	36(31.86)	33(29.20)	18(15.93)	2.466 SE= 0.412 p<0.001
Question 8*	3.76 ± 1.03	1(0.88)	14(12.28)	29(25.44)	37(32.46)	33(28.95)	2.172 SE= 0.387 p<0.001

Legend: CAS-R : Control Attitudes Scale-Revised; SD: standard deviation; proportion of sample who chose each answer choice present in n(%)

*Reverse coded items; Item-level discrimination statistics are reported as a discrimination statistic (the higher the better the item is at discriminating a scorer), SE: standard error, p-value of <0.05 indicates that the item significantly discriminates scorers. Smaller standard errors presented in item-level discrimination statistics indicate a more precise/discriminant measurement.