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Defining Treatment Response and Remission in Youth Anxiety: A Signal Detection Analysis with the Multidimensional Anxiety Scale for Children

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Abstract

Objective—To determine the percent reduction cutoff on the Multidimensional Anxiety Scale for Children (MASC) that optimally predict treatment response and remission in youth with anxiety disorders.

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Method—Youths and their parents completed the MASC-C/P pre- and post-treatment, and the Anxiety Disorders Interview Schedule for DSM-IV–Child and Parent Versions (ADIS-IV-C/P) and Clinical Global Impression – Improvement scale (CGI-I) were administered by independent evaluators. Treatment response and remission were defined by posttreatment ratings on the CGI-I and the ADIS-IV-C/P, respectively. Quality receiver operating characteristic methods determined the optimal cutoff on the MASC-P for predicting overall remission (loss of all study entry diagnoses), and optimal percent reductions on the MASC-P for predicting treatment response and remission of separation anxiety, social anxiety and generalized anxiety.

Results—A posttreatment raw score of 42 optimally predicted remission. A reduction of 35% on the total MASC-P predicted treatment response. A reduction of 30% on the Separation Anxiety/Panic subscale of the MASC-P predicted separation anxiety remission. A reduction of 35% on the Social Anxiety subscale of the MASC-P predicted social anxiety remission. The MASC did not evidence a cutoff for remission of Generalized Anxiety Disorder.

Conclusion—MASC cutoffs can facilitate comparison across studies and guide practice, aiding clinicians in assessing progress and informing treatment plans.

Keywords

child anxiety; treatment outcome; measurement; Multidimensional Anxiety Scale for Children; clinical assessment

Introduction

Anxiety disorders are highly prevalent among youth (10% to 32%),^{1,2} and are likely to persist into adulthood if not treated.^{1,3} Moreover, youth anxiety disorders are associated with other problems including impairments in psychosocial functioning,⁴ poorer educational achievement,⁵ and increased rates of suicidal ideation.^{6,7} Effective treatment reduces sequelae.^{7–9} In this paper, we evaluate methods of establishing response and remission for youth anxiety disorders using self- and parent-reports.

Studies support the efficacy of cognitive-behavioral therapy (CBT) and selective-serotonin reuptake inhibitors for treating youth anxiety^{10–12}; nevertheless some youth remain symptomatic.¹³ Treatment response and remission are important indices of the outcomes. Treatment response is defined as when “anxiety symptoms have improved to a degree that the patient/family/independent evaluator (IE) or clinician feel a significant change has occurred” and “is large enough that it is distinctly noticeable by observers who know the patient well”.¹⁴ Remission is more conservative and requires the absence or near absence of symptoms following treatment. A youth who has achieved remission has, by definition, also responded to treatment; however, not all treatment responders are remitters.

Measures are necessary to assess outcome, of which there are three types for youth: diagnostic/symptom ratings by clinicians, youth-reports, and parent-reports. Measures of outcome have included change in severity ratings or diagnostic status on the Anxiety Disorders Interview Schedule for DSM-IV–Child and Parent Versions (ADIS-IV-C/P)¹⁵ as well as ratings of improvement on the Clinical Global Impression – Improvement scale (CGI-I).¹⁴ Moving forward, youth and parent reports have greater advantages for treatment

in clinical settings, as the measures typically used to assess outcomes in research have some limitations. Defining remission as the loss of anxiety diagnoses on the ADIS-IV-C/P classifies youth with subclinical levels of anxiety posttreatment in the same way as those who have an absence of symptoms, since both groups will not meet diagnostic criteria. The gathering of data used to determine ADIS-IV-C/P or CGI scores is time consuming and requires intensive training. A full diagnostic evaluation following treatment is less likely to be used in routine clinical care. Assessments of outcome, however, are critical to improving service-provision guidelines, identifying progress of individual, and comparing treatments across trials.

Efforts to establish less cumbersome measures of treatment response in youth with anxiety used the Pediatric Anxiety Rating Scale (PARS).^{16–19} This strategy, though helpful, is a clinician-rated measure and has some of the same limitations as the ADIS-IV-C/P or the CGI. Furthermore, PARS findings are limited by the fact that the CGI scores used to determine PARS cutoffs were arrived at using all available information, and thus the CGI scores may have been influenced by other clinician-rated measures.¹⁷ Accordingly, CGI scores and PARS scores are not independent of one another; thus, the cutoffs identified for the PARS may be slightly biased. Clinician measures, such as the PARS, may introduce rater heterogeneity (e.g., different clinicians at baseline and post-treatment), which can influence reliability.

Self-report measures, such as the Multidimensional Anxiety Scale for Children (MASC),²⁰ where the same reporter completes it at baseline and posttreatment remove this concern. The MASC, considered a broadband youth anxiety rating scale²¹ is an efficient youth- or parent-report measure that corresponds well with diagnostic evaluations.^{22–25} The ease with which the measure is completed – it requires neither clinician training nor time for each administration – makes it practical and feasible for clinical settings. However, there exist no established criteria for its use. The present study explored the optimal percent reduction and absolute cutoff on the MASC-P for identifying (a) treatment response and (b) remission.

Method

Participants

Participants were the 438 youth who completed measures pre-and post-treatment of the 488 who participated in the Child/Adolescent Multimodal Study (CAMS) investigating the efficacy of medication (i.e., sertraline; SRT, $n = 113$), CBT (i.e., *Coping Cat*, $n = 133$), their combination (COMB, $n = 126$) or pill placebo ($n = 64$).^{12,26} Participants (ages 7–17) and had a principal diagnosis of Separation Anxiety Disorder (SepAD), generalized anxiety disorder (GAD) and/or Social Anxiety Disorder (SocAD). Youths were randomly assigned to condition. Study criteria, participant characteristics, and response and remission rates have been described previously.^{12,26,27}

Measures

Anxiety Disorders Interview Schedule for DSM-IV–Child and Parent (ADIS-IV-C/P).¹⁵—The ADIS-IV-C/P is a clinician-administered semi-structured interview. A

composite diagnosis is established using youth and parent interviews. As in previous studies,^{13,17,28} remission was defined as the loss of a targeted diagnosis posttreatment as determined using the ADIS-IV-C/P. The ADIS-IV-C/P has both convergent and discriminant validity,²¹ as well as retest reliability and κ coefficients ranging from 0.80 to 0.92 for different anxiety disorders.²⁹ High inter-rater agreement on diagnostic status (ICCs=0.82–0.88) in CAMS was established by a videotaped review of 10% of the interviews.

Clinical Global Impression – Improvement Scale (CGI-I).¹⁴—The CGI-I is a one-item scale assessing improvement. The scale ranges from 1 (very much improved) to 7 (very much worse), and consistent with previous studies, treatment response was defined as a 1 or a 2.^{12,17}

Multidimensional Anxiety Scale for Children (MASC).²⁰—The MASC is a 39-item self-report questionnaire of anxiety (MASC-C) symptoms in youth with a corresponding parent version (MASC-P).^{20,24} In addition to a total (0 to 117), the items yield four subscales: Physical Symptoms (12 items), Social Anxiety (9 items), Separation Anxiety/Panic (9 items), and Harm Avoidance (9 items). Concurrent and discriminant validity have been established,^{20,30} and the MASC has acceptable diagnostic accuracy.^{22–25}

Procedures

Participants were from six sites, with Institutional Review Board approval. Parents provided written consent and youth provided assent. Before randomization, participants completed an assessment with an IE who remained blind to the participant's condition.²⁷ IEs interviewed the youth and parent separately. Youth completed the MASC-C; parents completed the MASC-P. These same procedures were followed at posttreatment, with the addition of IE CGI-I ratings. IEs were trained to reliability criterion on the ADIS-IV-C/P and monitored throughout (weekly on-site supervision and biweekly cross-site calls).

Data Analytic Plan

Analyses were conducted for the total sample, as well as for each principal diagnosis with the corresponding subscale on the MASC (the Physical Symptoms and Harm Avoidance subscales for GAD, the Separation Anxiety/Panic subscale for SepAD, and the Social Anxiety subscale for SocAD). Analyses were repeated for each of the four treatment conditions separately. CAMS had two baseline points. For this study, the second baseline, right before the youth began treatment, was used for all participants except one, whose diagnosis was carried forward from the first baseline and believed to be stable. Receiver Operating Characteristic (ROC) methods^{31–33} employed in previous studies^{17,34,35} assessed the ability of different absolute raw score cutoffs to predict overall remission (as defined by the loss of all study entry diagnoses on ADIS-IV-C/P), and of percent reduction cutoffs to predict treatment response (as defined by the CGI-I) and remission of GAD, SepAD and SocAD (as defined by loss of the corresponding diagnosis on the ADIS-IV-C/P). ROC analyses, derived from signal detection theory,^{36,37} separately assess sensitivity (a true positive – the probability that youth meeting the gold standard criterion will exceed the test cutoff), specificity (a true negative – the probability that youth not meeting the gold standard criterion will not exceed the test cutoff), predictive value of a positive test (the probability

that youth exceeding the test cutoff will meet the gold standard criterion), predictive value of a negative test (the probability that youth not exceeding the test cutoff will not meet the gold standard criterion), and efficiency (the probability that there will be agreement between the test and the gold standard) for pre-established cutoff scores.

Consistent with past efforts, the MASC percent reduction scores were divided in 5% intervals^{17,34,35} for the total and four subscales. To evaluate the performance of each, as well as of absolute raw scores, ROC curves depict the balance between sensitivity and specificity. The optimal tradeoff between sensitivity and specificity for each of the cutoffs was measured by calculating Youden's J ($J = \text{sensitivity} + \text{specificity} - 1$); a value of 0 denotes no discrimination between sensitivity and specificity and 1 denotes perfect discrimination.³⁸

Because concerns have been raised about traditional ROC analyses, quality receiver operating characteristic (QROC) methods^{39,40} were used. QROC methods use specific weighted κ statistics that evaluate the quality of various ROC statistics.^{39,40} For quality of sensitivity, quality of specificity, and quality of efficiency, $\kappa(1.0)$, $\kappa(0.0)$, and $\kappa(0.5)$ were used as the respective statistics, consistent with a similar study.¹⁷ Values of these statistics range from 0.00 to 1.00, with <0.20 indicating poor agreement between the MASC cutoff and the gold standard for responder/remitter status, 0.21–0.40 indicating fair agreement, 0.41–0.60 indicating moderate agreement, 0.61–0.80 indicating good agreement and 0.81–1.00 indicating very good agreement.⁴¹ Consistent with previous studies,^{17,34,35,42} we prioritized the $\kappa(0.5)$ statistic to maximize efficiency (accuracy of classification), thus minimizing false-positive and false-negative results (neither of which is clearly most costly).

Results

Missing Data

Data were analyzed for all parents and youth who completed pre- and post-treatment measures in CAMS (N = 436; no missing data for ADIS-IV-C/P or CGI-I).

Descriptive Statistics

Because the optimal percent reduction cutoffs for the MASC-P consistently showed greater quality of efficiency than MASC-C cutoffs, MASC-P results are reported. The mean MASC-P score was 64.92 (SD = 14.86) at pretreatment and 38.89 (SD = 17.38) at posttreatment. Scores were significantly different from pre- to post-treatment ($t(435) = 29.94$, $p < 0.001$) and the average percent reduction on the MASC-P over treatment was 39.20% (SD = 25.59%). For the MASC-P Separation Anxiety/Panic subscale, the mean score was 14.81 (SD = 6.27) at pretreatment and 7.75 (SD = 5.76) at posttreatment. Scores were significantly different from pre- to post-treatment ($t(435) = 26.94$, $p < 0.001$) and the average percent reduction on the MASC-P Separation Anxiety/Panic subscale over treatment was 47.99% (SD = 35.84%). For the MASC-P Social Anxiety subscale, the mean score was 18.42 (SD = 5.94) at pretreatment and 10.83 (SD = 7.21) at posttreatment. Scores were significantly different from pre- to post-treatment ($t(435) = 24.47$, $p < 0.001$) and the mean percent reduction on the MASC-P Social Anxiety subscale over treatment was 40.43% (SD = 39.56%). For the MASC-P Harm Avoidance subscale, the mean score was 19.45 (SD = 3.95)

at pretreatment and 15.14 (SD = 5.19) at posttreatment. Scores were significantly different from pre- to post-treatment ($t(435) = 18.43, p < 0.001$) and the mean percent reduction on the MASC-P Harm Avoidance subscale over treatment was 21.37% (SD = 25.73%). For the MASC-P Physical Symptoms subscale, the mean score was 12.25 (SD = 6.25) at pretreatment and 5.17 (SD = 5.02) at posttreatment. Scores were significantly different from pre- to post-treatment ($t(435) = 24.06, p < 0.001$) and the mean percent reduction on the MASC-P Physical Symptoms subscale over treatment was 54.62% (SD = 42.66%).

Following treatment, 64.45% of youth met for treatment response based on the CGI-I. Additionally, 52.75% of youth met for overall clinical remission based on the ADIS-IV-C/P. Based on the ADIS-IV-C/P administered posttreatment, 70.59% of youth who began treatment with SepAD achieved SepAD remission, 53.98% of youth who began treatment with SocAD achieved SocAD remission, and 70.00% of youth who began treatment with GAD achieved GAD remission.

Predicting Treatment Response with the MASC-P

Table 1 presents ROC and QROC statistics for the prediction of treatment response (CGI-I) using MASC-P percent reduction cutoffs. Maximum efficiency for predicting treatment response was found at a cutoff of 35% ($\kappa(0.5) = 0.51$, efficiency = 0.77). Figure 1 presents quality of efficiency of each MASC-P percent reduction cutoff for predicting treatment response. At this optimal cutoff, the predictive value of a positive test was 0.86 and the predictive value of a negative test was 0.64, indicating a false positive rate of 14% and a false negative rate of 36% respectively. Separate analyses for each condition were largely consistent, with a slight deviation for the COMB condition; the optimal percent reduction cutoffs were 35% for SRT ($\kappa(0.5) = 0.39$, efficiency = 0.71), 35% for CBT ($\kappa(0.5) = 0.57$, efficiency = 0.79), 20% for COMB ($\kappa(0.5) = 0.34$, efficiency = 0.87), and 35% for placebo ($\kappa(0.5) = 0.57$, efficiency = 0.81).

Predicting Overall Remission with the MASC-P

Table 2 presents ROC and QROC statistics for the prediction of overall remission (ADIS-IV-C/P) using MASC-P absolute cutoffs. Maximum efficiency for predicting overall remission was found at a raw score cutoff of 42 ($\kappa(0.5) = 0.47$, efficiency = 0.74). Figure 2 presents quality of efficiency of each MASC-P raw score cutoff for predicting remission. At this optimal cutoff, the predictive value of a positive test was 0.72 and the predictive value of a negative test was 0.77, indicating a false positive rate of 28% and a false negative rate of 23% respectively. Analyses for each condition consistently indicated the optimal absolute cutoff to be 42 ($\kappa(0.5) = 0.47$, efficiency = 0.74 for all conditions).

Predicting Remission of Specific Diagnoses using MASC-P Subscales

Table 3 presents ROC and QROC statistics for the prediction of SepAD remission using MASC-P percent reduction cutoffs. Maximum efficiency for predicting SepAD remission was found at a cutoff of 30% ($\kappa(0.5) = 0.55$, efficiency = 0.81). Figure 3 presents quality of efficiency of each MASC-P percent reduction cutoff for predicting SepAD remission. At this optimal cutoff, the predictive value of a positive test was 0.88 and the predictive value of a negative test was 0.67, indicating a false positive rate of 12% and a false negative rate of

33% respectively. Analyses for each condition were mostly consistent; the optimal percent reduction cutoffs were 35% for SRT ($\kappa(0.5) = 0.61$, efficiency = 0.82), 45% for CBT ($\kappa(0.5) = 0.46$, efficiency = 0.74), 35% for COMB ($\kappa(0.5) = 0.45$, efficiency = 0.87), and 30% for placebo ($\kappa(0.5) = 0.66$, efficiency = 0.83).

Table 4 presents ROC and QROC statistics for the prediction of SocAD remission using MASC-P percent reduction cutoffs. Maximum efficiency for predicting SocAD remission was found at a cutoff of 35% ($\kappa(0.5) = 0.50$, efficiency = 0.75). Figure 3 presents quality of efficiency of each MASC-P percent reduction cutoff for predicting SocAD remission. At this optimal cutoff, the predictive value of a positive test was 0.77 and the predictive value of a negative test was 0.73, indicating a false positive rate of 23% and a false negative rate of 27% respectively. Analyses for each condition were mostly consistent; the optimal percent reduction cutoffs were 35% for SRT ($\kappa(0.5) = 0.48$, efficiency = 0.75), 35% for CBT ($\kappa(0.5) = 0.53$, efficiency = 0.77), 45% for COMB ($\kappa(0.5) = 0.46$, efficiency = 0.74), and 55% for placebo ($\kappa(0.5) = 0.49$, efficiency = 0.79).

Maximum efficiency for predicting GAD remission with the Harm Avoidance subscale was found at a cutoff of 10% ($\kappa(0.5) = 0.20$, efficiency = 0.66). However, based on the ROC and QROC statistics, the Harm Avoidance scale on the MASC-P does not appear to be useful for determining GAD remission. Maximum efficiency for predicting GAD remission with the Physical Symptoms subscale was found at a cutoff of 60% ($\kappa(0.5) = 0.44$, efficiency = 0.74). At this optimal cutoff, the predictive value of a positive test was 0.88 and the predictive value of a negative test was 0.54, indicating a false positive rate of 12% and a false negative rate of 46% respectively. Tables and figures presenting the prediction of GAD remission with MASC-P percent reduction cutoff, as well as all MASC-C results and MASC-P results for specific treatment conditions, are available from the first author upon request.

Discussion

The MASC-P yielded useful percent reduction cutoffs for evaluating treatment response and diagnostic remission for SepAD and SocAD, as defined by “gold standard” measures. It also yielded useful raw cutoffs for predicting overall remission. The optimal MASC-P percent reduction for treatment response was 35%. A 30% reduction in the MASC-P Separation Anxiety/Panic score best predicted SepAD remission and a 35% reduction in the MASC-P Social Anxiety score best predicted SocAD remission. These optimal percent reductions deviated slightly for each treatment condition, but the general consistency for the full-sample analyses provide the most parsimonious and useful guideline. The optimal posttreatment absolute score on the MASC-P for determining ADIS-defined remission was 42. Although the optimal Physical Symptoms cutoff performed better than the Harm Avoidance subscale in predicting GAD remission, the MASC was generally not informative in identifying GAD remission. Accuracy of classification was prioritized in determining these cutoff scores; if a clinician/researcher considers false negatives more costly than false positives or vice versa, he/she may choose cutoffs based on the optimal $\kappa(1.0)$ statistic or the $\kappa(0.0)$ statistic, respectively.

The MASC-P offers an alternative to clinician-ratings for assessing treatment progress. The merits of the MASC-P cutoffs identified as optimal for predicting treatment response and remission are supported by the use of reliable IEs as well as by consistency with PARS cutoffs identified as optimal for predicting treatment response (35% reduction in the total score).¹⁷ The use of MASC cutoffs adds to recently identified cutoffs on the Screen for Child Anxiety Related Emotional Disorders (SCARED).⁴²

Identifying meaningful treatment change is valuable for research and practice. Having an indicator offers a way for practitioners to ascertain when a treatment is/is not working.⁴³ Inconsistency in how treatment outcomes are identified^{17,44–46} is an issue and the need for parent-reported measures to determine response and remission has been identified.^{17,22} These MASC-P absolute cutoff and percent reduction cutoffs can be implemented to objectively assess treatment response and remission across anxiety disorders (and SepAD and SocAD remission in youth). The present results provide an efficient/practical way to assess outcomes and to enable cross-study comparisons.

We did not find a meaningful cutoff for GAD remission; this makes sense given research indicating MASC limitations with GAD^{21,24} and limits of the Harm Avoidance subscale.⁴⁷ Furthermore, GAD may not lend itself to observation by a parent in the ways that SepAD and SocAD do; GAD is not often characterized by visible avoidance.

The limitations of the study were that CAMS inclusion/exclusion criteria may limit generalizability, although a large sample from six sites. To determine MASC-defined response and remission, we compared the MASC to other subjective measures, which thus have the possibility of being biased; however, as primary outcome measures that have been used in clinical trials and rated by reliable IEs, we believe they represent the current “gold standard.” Research is needed to evaluate these cutoffs in diverse clinics and to establish a parent-report measure that identifies GAD remission.

Despite limitations, the findings provide guidelines for using the MASC in future studies and in clinical care to assess treatment response and remission. We recommend that the MASC-P be incorporated into routine clinical practice, given to parents prior to their child beginning treatment for anxiety, and again following treatment or when considering termination. Clinicians may use MASC scores to determine if the youth has achieved overall remission (< 42 raw score), indicating that treatment may end; SepAD or SocAD remission (< 30% reduction and < 35% reduction respectively on corresponding scales of the MASC-P), indicating that treatment could shift to focusing on other disorders if present; or response (< 35% reduction) but not remission, indicating that the youth may benefit from continued treatment or augmentation (e.g., with more frequent CBT sessions or by adding CBT/ medication). Should the youth not have achieved treatment response, the clinician can consider augmenting or changing the treatment (i.e., CBT to medication or vice versa). As the MASC is a measure likely to be used by practitioners, the findings facilitate efficient assessment of treatment outcomes in routine care.

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Figure 1.
Quality Index of Efficiency of Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Percent Reduction Cutoff Scores to Predict Treatment Response Based on the Clinical Global Impressions – Improvement scale (CGI-I).

Figure 2.
Quality Index of Efficiency of Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Absolute Cutoff Scores to Predict Overall Remission Based on the Anxiety Disorders Interview – Child and Parent (ADIS-IV-C/P).

Figure 3.

Quality Index of Efficiency of Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Separation Anxiety/Panic and Social Anxiety Subscale Percent Reduction Cutoff Scores to Predict Separation Anxiety (SepAD) and Social Anxiety (SocAD) Remission Based on the Anxiety Disorders Interview – Child and Parent (ADIS-IV-C/P), respectively.

Table 1

Prediction of Treatment Response Based on the Clinical Global Impressions – Improvement scale (CGI-I) at Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Percent Reduction Cutoff Scores.

MASC Reduction (%)	Sensitivity ^a	Specificity ^b	Predictive Value of Positive Test Result ^c	Predictive Value of Negative Test Result ^d	Efficiency ^e	K(0.5) ^f	K(0.0) ^g	K(1.0) ^h	J ⁱ
5	0.97	0.19	0.69	0.77	0.69	0.19	0.64	0.11	0.16
10	0.95	0.26	0.70	0.75	0.71	0.25	0.62	0.16	0.21
15	0.94	0.35	0.72	0.75	0.73	0.32	0.61	0.22	0.28
20	0.91	0.47	0.76	0.74	0.75	0.42	0.60	0.32	0.38
25	0.88	0.58	0.79	0.72	0.77	0.48	0.57	0.41	0.46
30	0.80	0.69	0.82	0.66	0.76	0.49	0.47	0.51	0.49
35	0.77	0.77	0.86	0.64	0.77	0.51	0.45	0.60	0.53
40	0.66	0.85	0.89	0.58	0.73	0.46	0.35	0.68	0.51
45	0.59	0.90	0.92	0.55	0.70	0.43	0.30	0.77	0.49
50	0.49	0.95	0.95	0.51	0.66	0.38	0.24	0.87	0.45
55	0.39	0.96	0.95	0.46	0.59	0.28	0.17	0.85	0.35
60	0.32	0.99	0.98	0.44	0.56	0.24	0.14	0.94	0.30
65	0.27	0.99	0.97	0.43	0.53	0.20	0.11	0.93	0.26

Note: Optimal percent reduction for determining treatment response is bolded.

^aProbability that youth meeting for treatment response based on the CGI-I will exceed the MASC-P cutoff.

^bProbability that youth not meeting for treatment response based on the CGI-I will not exceed the MASC-P cutoff.

^cProbability that youth exceeding the MASC-P cutoff will meet for treatment response based on the CGI-I.

^dProbability that youth not exceeding the MASC-P cutoff will not meet for treatment response based on the CGI-I.

^eProbability that the MASC-P cutoff and the CGI-I agree.

^fQuality of efficiency.

^gQuality of specificity.

^hQuality of sensitivity.

ⁱYouden's J (J = sensitivity + specificity – 1) measures the optimal tradeoff between sensitivity and specificity for each individual cutoff.

Table 2

Prediction of Overall Remission Based on the Anxiety Disorders Interview – Child and Parent (ADIS-IV-C/P) at Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Raw Scores.

MASC Raw Score	Sensitivity ^a	Specificity ^b	Predictive Value of Positive Test Result ^c	Predictive Value of Negative Test Result ^d	Efficiency ^e	K(0.5) ^f	K(0.0) ^g	K(1.0) ^h	J ⁱ
36	0.66	0.77	0.76	0.67	0.71	0.43	0.38	0.50	0.43
37	0.70	0.75	0.76	0.69	0.72	0.45	0.42	0.49	0.45
38	0.72	0.73	0.75	0.70	0.72	0.45	0.43	0.47	0.45
39	0.74	0.71	0.74	0.71	0.73	0.45	0.45	0.45	0.45
40	0.78	0.67	0.73	0.73	0.73	0.45	0.50	0.42	0.45
41	0.80	0.66	0.72	0.74	0.73	0.45	0.51	0.41	0.45
42	0.83	0.64	0.72	0.77	0.74	0.47	0.56	0.40	0.46
43	0.84	0.62	0.71	0.78	0.74	0.47	0.57	0.39	0.46
44	0.86	0.59	0.70	0.79	0.73	0.45	0.59	0.36	0.44
45	0.87	0.58	0.70	0.80	0.73	0.46	0.63	0.36	0.45
46	0.88	0.56	0.69	0.81	0.73	0.45	0.63	0.35	0.44
47	0.89	0.53	0.68	0.81	0.72	0.43	0.65	0.32	0.43
48	0.90	0.51	0.68	0.83	0.72	0.43	0.67	0.31	0.42

Note: Optimal raw score for determining overall remission is bolded.

^aProbability that youth meeting for remission based on the ADIS-IV-C/P will exceed the MASC-P cutoff.

^bProbability that youth not meeting for remission based on the ADIS-IV-C/P will not exceed the MASC-P cutoff.

^cProbability that youth exceeding the MASC-P cutoff will meet for remission based on the ADIS-IV-C/P.

^dProbability that youth not exceeding the MASC-P cutoff will not meet for remission based on the ADIS-IV-C/P.

^eProbability that the MASC-P cutoff and the ADIS-IV-C/P agree.

^fQuality of efficiency.

^gQuality of specificity.

^hQuality of sensitivity.

ⁱYouden's J ($J = \text{sensitivity} + \text{specificity} - 1$) measures the optimal tradeoff between sensitivity and specificity for each individual cutoff.

Table 3

Prediction of Separation Anxiety (SepAD) Remission Based on the Anxiety Disorders Interview – Child and Parent (ADIS-IV-C/P) at Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Separation Anxiety/Panic Subscale Percent Reduction Cutoff Scores.

MASC Reduction (%)	Sensitivity ^a	Specificity ^b	Predictive Value of Positive Test Result ^c	Predictive Value of Negative Test Result ^d	Efficiency ^e	K(0.5) ^f	K(0.0) ^g	K(1.0) ^h	Ji
5	0.98	0.20	0.75	0.82	0.75	0.23	0.75	0.14	0.18
10	0.96	0.30	0.77	0.75	0.76	0.31	0.65	0.21	0.26
15	0.94	0.43	0.80	0.75	0.79	0.42	0.65	0.31	0.37
20	0.93	0.50	0.82	0.76	0.81	0.48	0.66	0.38	0.43
25	0.89	0.60	0.84	0.70	0.81	0.51	0.58	0.47	0.49
30	0.85	0.71	0.88	0.67	0.81	0.55	0.53	0.58	0.57
35	0.80	0.77	0.89	0.62	0.79	0.54	0.46	0.64	0.58
40	0.73	0.81	0.90	0.55	0.75	0.48	0.37	0.67	0.54
45	0.66	0.87	0.93	0.52	0.72	0.44	0.32	0.75	0.53
50	0.62	0.91	0.95	0.50	0.71	0.43	0.29	0.81	0.53
55	0.53	0.93	0.95	0.45	0.65	0.35	0.22	0.82	0.46

Note: Optimal percent reduction for determining SepAD remission is bolded.

^aProbability that youth meeting for SepAD remission based on the ADIS-IV-C/P will exceed the Separation Anxiety/Panic MASC-P subscale cutoff.

^bProbability that youth not meeting for SepAD remission based on the ADIS-IV-C/P will not exceed the Separation Anxiety/Panic MASC-P subscale cutoff.

^cProbability that youth exceeding the Separation Anxiety/Panic MASC-P subscale cutoff will meet for SepAD remission based on the ADIS-IV-C/P.

^dProbability that youth not exceeding the Separation Anxiety/Panic MASC-P subscale cutoff will not meet for SepAD remission based on the ADIS-IV-C/P.

^eProbability that the Separation Anxiety/Panic MASC-P subscale cutoff and the ADIS-IV-C/P agree.

^fQuality of efficiency.

^gQuality of specificity.

^hQuality of sensitivity.

ⁱYouden's J (J = sensitivity + specificity – 1) measures the optimal tradeoff between sensitivity and specificity for each individual cutoff.

Table 4

Prediction of Social Anxiety (SocAD) Remission Based on the Anxiety Disorders Interview – Child and Parent (ADIS-IV-C/P) at Different Multidimensional Anxiety Scale for Children – Parent (MASC-P) Social Anxiety Subscale Percent Reduction Cutoff Scores.

MASC Reduction (%)	Sensitivity ^a	Specificity ^b	Predictive Value of Positive Test Result ^c	Predictive Value of Negative Test Result ^d	Efficiency ^e	K(0.5) ^f	K(0.0) ^g	K(1.0) ^h	J ⁱ
5	0.94	0.27	0.60	0.80	0.63	0.22	0.62	0.13	0.21
10	0.91	0.33	0.62	0.76	0.64	0.25	0.56	0.16	0.24
15	0.88	0.41	0.64	0.75	0.67	0.31	0.54	0.22	0.30
20	0.87	0.50	0.67	0.76	0.70	0.38	0.56	0.28	0.37
25	0.84	0.58	0.70	0.76	0.72	0.43	0.55	0.35	0.42
30	0.81	0.64	0.73	0.74	0.73	0.45	0.51	0.40	0.45
35	0.77	0.73	0.77	0.73	0.75	0.50	0.51	0.50	0.50
40	0.70	0.80	0.80	0.69	0.74	0.49	0.43	0.57	0.50
45	0.64	0.85	0.83	0.67	0.74	0.48	0.38	0.64	0.49
50	0.61	0.86	0.84	0.65	0.72	0.46	0.35	0.65	0.47
55	0.54	0.90	0.86	0.63	0.70	0.42	0.31	0.69	0.44
60	0.49	0.91	0.86	0.60	0.68	0.39	0.27	0.70	0.40
65	0.41	0.91	0.85	0.57	0.64	0.31	0.20	0.67	0.32

Note: Optimal percent reduction for determining SocAD remission is bolded.

^aProbability that youth meeting for SocAD remission based on the ADIS-IV-C/P will exceed the Social Anxiety MASC-P subscale cutoff.

^bProbability that youth not meeting for SocAD remission based on the ADIS-IV-C/P will not exceed the Social Anxiety MASC-P subscale cutoff.

^cProbability that youth exceeding the Social Anxiety MASC-P subscale cutoff will meet for SocAD remission based on the ADIS-IV-C/P.

^dProbability that youth not exceeding the Social Anxiety MASC-P subscale cutoff will not meet for SocAD remission based on the ADIS-IV-C/P.

^eProbability that the Social Anxiety MASC-P subscale cutoff and the ADIS-IV-C/P agree.

^fQuality of efficiency.

^gQuality of specificity.

^hQuality of sensitivity.

ⁱYouden's J (J = sensitivity + specificity – 1) measures the optimal tradeoff between sensitivity and specificity for each cutoff.