



The RITA-T (Rapid Interactive (Screening) Test for Autism in Toddlers: A New Level 2 Autism Screening Tool

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RITA-T OVERVIEW

- Interactive Play-based Autism Screening Tool
- Currently validated for toddlers 18-36 months
- Can be administered by Clinicians, Nurses, Early Intervention & Early Childhood Educators
- Assesses developmental constructs delayed in early ASD such as: *Joint Attention (JA); Reaction to Emotions; Awareness of Human Agency*
- Administration and scoring time is within 10 minutes
- Consists in 9-interactive play-settings
- Toddlers reaction to examiner's "presses" are scored on an ordinal scale of typical to atypical (0-2,3, or 4) and total score generated.
- Training to Reliability achieved in 3 hours
- The RITA-T is language-free; only language is "Look" with a point gesture.
- Goal is to have the RITA-T and its training available in the Public Domain
 - @Tufts @UmassMedicalSchool
 - <http://www.umassmed.edu/autismrita-t/rita-t/>





Current Screening Methods for ASD

- **Level 1- Universal Screen**
 - **Autism screen recommended by American Academy of Pediatrics at 18 and 24 mos.**
 - **Example: MCHAT R/F**
 - **Low Positive Predictive Value (PPV) for ASD (0.54)**
 - **High PPV for Developmental Delay (0.98)**
- ➔ **Over-referral for ASD evaluations**
- ➔ **Longer wait delaying those who really need diagnosis**
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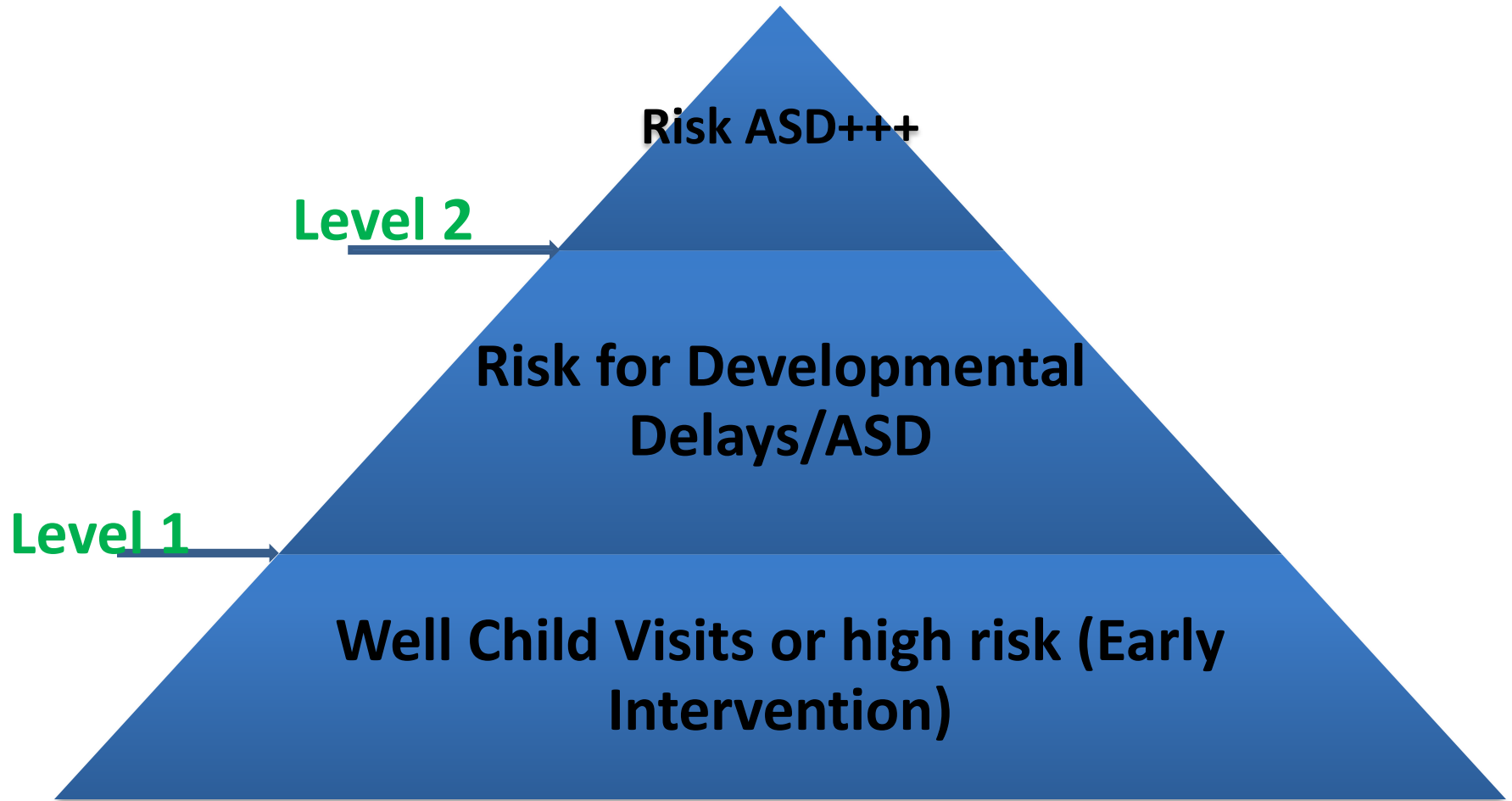
Current Screening Methods for ASD

- **Level 2 – Disorder-specific screener**
 - **Differentiates between ASD and other delays**
 - ➔ **Referrals for ASD evaluations more appropriate**
 - ❖ **Interactive Level 2 ASD screeners preferred**
 - ➔ **Triggers atypical behaviors**





Two-Level ASD Screening





Ideal ASD Level 2 screener

This model would allow improved access and two different clinical pathways

Toddlers with high risk of ASD would not be delayed for diagnostic confirmation

Early Intervention, Early Childhood educators can then do MCHAT R/F and RITA-T

**Reliable in 18-36 months
Easy to train and learn**

**Discriminates well
between toddlers with
ASD and those with Delays
that are non ASD**


**And most importantly:
FITS WELL INTO BUSY
PRACTICE FLOW**





Current

STAT:

- 20 minutes to administer and score
 - At cut off score of 2:
 - Psychometrics better in 2-3 y than in <2y
 - Can miss ASD vs. Autism
 - Expensive \$500
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DESCRIPTION of the RITA-T





Description of the RITA-T (Journal of Pediatrics, August 2015)

- 9 interactive presses
 - Assesses developmental constructs delayed in early ASD such as:
 - *Joint Attention (JA)*
 - *Reaction to Emotions*
 - *Awareness of Human Agency*
- Each item coded from 0 to 2, 3 or 4 (typical to atypical)
 - Total score generated; maximum: **30**
 - The lower the score, the more typical the reaction

❖ Administration and scoring time: **10 minutes**



The RITA-T Activities

Item	Constructs	Materials	Administration	Score
*A-Blocked exploration of a toy (TL:11s)	SA; JA; HA	Toy phone	Child explores toy. Examiner blocks it, 3 times. Observe EC and latency to EC for 11 s.	0-4 for EC; time to EC; or giving up
B-Object Tease	SA; JA; HA	Toy Phone	Examiner pretends to give toy to child then pulls back, 3 times. Observe EC to examiner or parent.	0-2 for EC to parent, examiner or both
*C-Blocked Vision (TL: 11 s)	SA; JA; HA	Toy Opaque screen	Child explores toy; examiner blocks toy from behind the child using a screen for 11s. Observe EC, JA.	0-3 for EC; Time to EC
D-Magic Ball	Cog JA	"Magic" cup & ball	Ball in magic cup shown to child then examiner makes it disappear, 3 times. Observe surprise; JA to examiner & parent.	0-3 for reaction of surprise; EC to parent and/or examiner
E-Color Constancy	Cog JA	"Magic" scarf	Examiner shows double-sided magic scarf on one side initially then examiner changes color abruptly. Observe surprise; JA to examiner or parent.	0-2 for reaction of surprise; JA to parent or examiner
F-*Object vs. Face (TL:15s)	SA	Pictures of train & baby	A foam circle with pictures of a baby and of a train on either side is presented to the child 5s each side. Observe picture preference for 5s.	0-2 for preference to baby (0), train pictures (1), or no interest at all (2)
G -Rapid JA	JA	Ceiling light	Examiner calls child suddenly and points at ceiling light. Observe JA.	0-1 for JA
H*-Sad Face, Still Face (TL:10s each)	SA	Caregiver	Caregiver is asked to pretend to cry: Observe: distress, EC, proximity seeking or no interest for 10s. Then caregiver is asked to have a neutral expression; Observe same for 10s.	0-4 each: 0-1 score provided to each reaction observed.
I-Recognition	Cog SR	Marker Mirror	A red dot is marked on forehead with removable non-allergenic marker. Examiner holds small mirror to child. Observe reaction to recognizing dot and taking it away.	0-2 for recognizes the red dot; attempts to remove it

The RITA-T Scoring Sheet

RITA-T (Rapid Interactive screening Test for Autism in Toddlers) Scoring Sheet

Patient ID: _____ DOB: _____ DOV: _____ Examiner: _____

At the beginning of the test, mark the child's forehead with a circular red dot. JA=Joint Attention; SA=Social Awareness; HA=Human Agency; C=Cognition.

A. Blocking of Phone: 3 times - Take best score.				SA, HA
1. Looks at examiner's eyes:	Y (0)	N (1)		
2. Latency to look at examiner's eyes:	0-5s = (0); 6-10s = (1); 11s or more = (2)			
3. Abandonment (gives up):	Y (1)	N (0)		(0-4)
B. Toy Tease: 3 times.				JA
1. Looks at examiner's eyes:	Y (0)	N (1)		
2. Looks at parent's eyes:	Y (0)	N (1)		
3. Looks at both:	Y (0)	N (1)		(0-3)
C. Blocked Vision.				JA, HA
1. Looks at examiner's eyes:	Y (0)	N (1)		
2. Latency to look:	0-5s = (0); 6-10s = (1); 11s or more = (2)			(0-3)
D. Magic Ball: 3 times				C, JA
1. Reaction (surprise):	Y (0)	N (1)		
2. Seeking object:	Y (0)	N (1)		
3. Joint attention to parent or examiner:	Y (0)	N (1)		(0-3)
E. Color Constancy (Scarf): 3 times.				C, JA
1. Surprise:	Y (0)	N (1)		
2. Joint attention to parent (immediate):	Y (0)	N (1)		
3. Joint attention to examiner (immediate):	Y (0)	N (1)		
4. Joint attention to both (simultaneously):	Y (0)	N (1)		(0-4)
F. Object vs. Face: 10 seconds.				SA
1. Preference for face	Y (0)			
2. Preference of object	Y (2)			
3. No interest, preference or awareness:	Y (1)			(0-2)
G. Reaction to Rapid Joint Attention (look to overhead light): Two times				JA
1. Child looks same direction:	Y (0)	N (1)		
				(0-1)
H. Still Face - Caregiver's face: 10 second each.				SA
A. Sad (Pretend to cry):				
1. Proximity seeking:	Y (0)	N (1)		
2. Eye contact:	Y (0)	N (1)		
3. Distress:	Y (0)	N (1)		
4. Interest:	Y (0)	N (1)		(0-4)
B. Neutral (No emotion):				
1. Proximity seeking:	Y (0)	N (1)		
2. Eye contact:	Y (0)	N (1)		
3. Distress:	Y (0)	N (1)		
4. Interest:	Y (0)	N (1)		(0-4)
I. Self-Recognition.				C, SA
1. Child looks at mirror and self:	Y (0)	N (1)		
2. Child recognizes dot AND tries to take it off:	Y (0)	N (1)		(0-2)
TOTAL SCORE				(0-30)
Hyperactivity	Sensory Seeking Behaviors	Repetitive Behaviors	Difficulty to get attention	Other



Eye Contact and JA

“Checking in” to share interest/surprise to a magical change in colors or to disappearing ball





Human Agency & Social Awareness

**Child aware of person blocking
object not just “the hand”**

**Child aware of others 'emotions
and reacts**






Videos of the RITA-T





VALIDATION

- 1- Develop a Replicable Training Module and Establish Scoring Reliability
 - 2- Establish Criterion-Related Validity with other ASD Measures, e.g., the Autism Diagnostic Observation Schedule (ADOS)
 - 3-Generalize the RITA-T to other clinic populations and to other Developmental Evaluation Centers and study psychometrics and effect on wait times
 - 4-Test new models of early screening for ASD with Early Intervention and Early Education Centers to improve early identification
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Validation - Reliability Training

- Scoring algorithm, Manual and training developed and tested. Training consists of:
 - Observation & Scoring of videos of RITA-T administration
 - Group discussion of scoring
 - Scoring of videos independently
 - Inter-Rater Reliability (IRR) calculation
- Initial and subsequent trainings:
 - IRR: Kappa= 0.8-1.0 (very good to excellent)

Current training module : Two sessions of 90 minutes each





Initial validation Sample (J of Pediatrics, 2015)

- **74** toddlers were enrolled
- **13** were excluded
 - » **61** continued the study
- **23** had **ASD**
- **19** had **DD (Developmental Delay)/Non-ASD** diagnoses
 - Language Delay (LD) in 12
 - Global Developmental Delay (GDD) in 7
- **19** were “**TD**” (**NCR: No Concerns Raised**)






Results- Demographics

	ASD (N=23)	NonASD (N= 19)	NCR (N=19)	P-value
Female N (%)	1 (4)	8 (36)	12 (63)	<0.001
Age months Mean (SD)	27.77 (5.7)	29.46 (6)	21.7 (6.5)	0.001
Race N (%)				0.07
White N (%)	11 (47.8)	15 (79)	8 (42.1)	
Hispanic	8 (34.7)	3 (15.8)	4 (21)	
Other	4(17.3)	1(5.2)	7(36.8)	
Income N (%)				NS
>\$50,000	7 (30.4)	8 (42.1)	6 (31.5)	
<\$50,000	16 (69.5)	11 (58)	13 (68.4)	


P-values for group differences are based on ANOVA for continuous variables and chi-square tests for categorical variables.





Results- Mean Scores (SD) by Diagnoses


	ASD	DD/NON-ASD	NCR	P-VALUE
RITA-T	20.8 (3.6)	13 (2.5)	10.9 (2.12)	<0.0001
M-CHAT				
Total Items failed (SD)	8.7 (4.9)	4 (3.6)	1.3(1.6)	<0.0001
M-CHAT				
Mean critical failed (SD)	2.87 (2.3)	1.42 (1.6)	0.11 (0.31)	<0.0001
DSM IV	8.96 (1.99)	0.89 (1.15)	N/A	<0.0001
DSM 5	6.04 (0.88)	0.75 (1.15)	N/A	<0.0001
MULLEN Receptive Language	29.7 (12.3)	33.8 (15.2)	N/A	NS
MULLEN Expressive Language	28.4 (13.2)	29.6 (13.4)	N/A	NS
MULLEN Visual Reception	32.8 (10.7)	40 (14.65)	N/A	NS





Results- Correlations of RITA-T with Autism measures


Correlations	DSM IV criteria checked	DSM5 criteria checked	ADOS Composite Score
r=	0.78	0.76	0.79
N=	42	42	25
t=	7.81	7.37	6.14
p= (two-tailed)	<0.0001	<0.0001	<0.0001





Sensitivity & Specificity for all cut-off scores

RITA-T Total score	Sensitivity	Specificity	PPV	NPV
8	1	0.05	0.56	1
9	1	0.11	0.58	1
10	1	0.16	0.59	1
11	1	0.26	0.62	1
12	1	0.37	0.66	1
13	1	0.53	0.72	1
14	1	0.84	0.88	1
15	0.96	0.84	0.88	0.94
16	0.83	0.89	0.90	0.81
17	0.74	0.95	0.94	0.75
18	0.65	1	1	0.70
19	0.61	1	1	0.68
21	0.48	1	1	0.61
22	0.35	1	1	0.56
23	0.30	1	1	0.54
24	0.13	1	1	0.49
25	0.09	1	1	0.48
26	0.04	1	1	0.46
27	0	1	1	0.45



ROC CURVE



Current Validation Studies

Generalization & New models





Testing the two-level ASD screening model

- **Aim 1**

Study the RITA-T in a 2 level screening model to improve early identification (in specialized clinics; in Early Intervention)

- **Aim 2**

Apply RITA-T psychometrics to a different population and generalize/refine findings



a- Collaboration with Alberta Children's Hospital

- Division of Developmental and Behavioral Pediatrics (Jean Francois Lemay, MD FRCPC; two speech therapists, psychologist)
- Goal: Reduce patient wait-list time for toddlers 18- 39 months referred for diagnostic evaluations for possible ASD
- October, 2013: wait to be evaluated was 12 months
- New model and triage with RITA-T: Parent meeting; MCHAT & RITA-T administration then triage to specific testing group





Triage Groups Based on RITA-T Score

Low Risk : score < under 12

Vineland; DSM5

Medium Risk: score is between 12-16

Vineland; ADOS2; DSM5

High Risk: score > above 16

Vineland; DSM5





Results


- **173** toddlers tested
- RITA-T average administration time: 9 minutes
- New model improved wait time and patient flow
- Preliminary results
 - Consistent
 - Cannot be shared yet publicly





Results of New Triage Protocol

DATE	NUMBER of toddlers	WAIT TIME TO DIAGNOSTIC VISIT
OCT, 2013	104	12-13 MONTHS
MAY, 2014	29	6 MONTHS
SEPT, 2014	11	2 MONTHS
JAN, 2016		28 days



b- Studies ongoing at UMass in Worcester (Developmental and Behavioral Pediatrics- DBP)





a- Testing model with Early Intervention

The THOM Early Intervention program in Worcester:

- EI providers all trained on the MCHAT-R/F
- Three EI providers from Autism team trained reliably on the RITA-T
- Pediatric clinics (UMass; Child Health) informed about study. MCHAT R/F completed by pediatricians.
- All toddlers enrolled in EI program receive MCHAT-R/F
- Those with concerns on MCHAT R/F or concerns clinically are administered the RITA-T
- They are then referred to diagnostic team in DBP at UMass in Worcester



DBP UMass Worcester Diagnostic Team and Testing

Diagnostic evaluation team at UMass:

- The Autism Diagnostic Observation Schedule (ADOS)-2
- The Mullen Scales of Early Learning
- Diagnoses discussed with families
- Study approved by IRB





b- Collecting further validation data

- ALL Referrals to DBP for ages 0-3 (from community; families; other EI programs)
 - Evaluated by DBP directly
 - Evaluated part of clinical project:
 - Toddler receives MCHAT R/F; RITA-T; ADOS 2; MSEL
 - Diagnoses discussed
 - Study approved by IRB






c- Results

- Wait time from EI study program: within 1 month
- Wait time from community: 1-3 months
 - Currently
- 77 toddlers enrolled so far (as of April 22, 2016)
 - Study ongoing; stay tuned for results...





SUMMARY: The RITA-T

- **Correlates well with Autism diagnostic measures**
 - **Reliable training is easily obtained**
 - **Discriminates well between toddlers with DD/NonASD & ASD**
 - **At 5-10 minutes, it fits very well into clinic flow**
 - **The RITA-T is a reliable and reasonably valid Level 2 interactive ASD screening test for toddlers**
 - **Facilitates earlier detection and two-level screening models**
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Future steps

- Continuing to collect data ; results available summer 2016
- Website, training tapes and CME in progress; summer 2016
- Test will be available in public domain at low costs
- Website: <http://www.umassmed.edu/AutismRITA-T/>
 - For information or questions:
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Thank you

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Thank You!