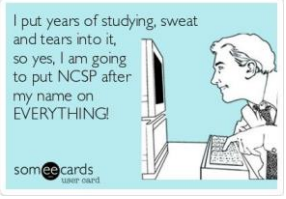
Conners CPT 3™, Conners CATA™, and Conners K-CPT 2™: Introduction and Application

Amy Patenaude, Ed.S., NCSP
MHS Assessment Consultant ~ School Psychologist

MHS

Your Presenter



Amy Patenaude, Ed.S., NCSP
MHS Assessment Consultant
Amy.patenaude@mhs.com

@Amy_Patenaude

https://www.linkedin.com/in/amypatenaude

MHS

Disclosure

I work for Multi-Health Systems (MHS),
the publisher of the assessment tools that we will be discussing today.
Rating scales should not be used as the sole basis
for making a diagnosis or educational eligibility decision.

MHS

Training Objectives

- Best practices in the assessment of ADHD and EF
- CPT 3 and CATA and their essential features
- CEFI and its essential features
- Case study examples

MHS ASSESSMENTS

CPT3 & CATA: Key Features

MHS ASSESSMENTS

What is a Continuous Performance Test (CPT)?

- Performance/Task based assessment that measures different areas of attention such as sustained attention, inattentiveness, impulsivity, and vigilance
- Provides ***objective*** information regarding an individual's attentional difficulties
- Clients presented with repetitive boring task and must maintain their focus over a period of time in order to respond to targets or inhibit response to non-targets

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Why should we be interested in utilizing the Conners CPT-3 and Conners CATA?

- Objective measure
- Performance based task: engages students/patients/clients and helps build rapport
- Helps pinpoint type of attention problem
- Increases diagnostic and classification accuracy when paired with other assessment measures

Why should I be interested in the CPT-3 and CATA?

Classification Statistic	Conners 3-P	Conners 3-P & Conners CATA	Conners 3-P & Conners CPT 3	Conners 3-P, Conners CPT 3 & Conners CATA
Overall Correct Classification (%)	83.9	88.4	88.4	93.8
Sensitivity (%)	86.0	91.2	89.5	94.7
Specificity (%)	81.8	85.5	87.3	92.7

Conners Continuous Performance Test 3rd Edition (Conners CPT 3™)

Amy Patenaude, Ed.S., NCSP
1(800)456-3003 x331

Conners CPT-3 Key Features

- Ages 8+; assesses attention related problems
- 14 minutes; in addition to 1 minute practice test
- Non-X paradigm: ignore X and respond to all other targets
- High proportion of targets to non-targets
- Varied time intervals between targets (1, 2, or 4 sec ISI)
- By-Block statistics (6 blocks with 60 trials each)
- Practice Test
- Can be part of a battery of assessments for ADHD and other disorders/neurological problems characterized by attention problems

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

What does the Conners CPT-3 measure?

- Assesses attention related problems
- Examines four dimensions of attention:
  1. Inattentiveness
  2. Impulsivity
  3. Sustained Attention
  4. Vigilance
- Validity Check
- Response Style Analysis:
  1. Liberal
  2. Conservative
  3. Balanced

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CPT 3 Scores

Variable	Description
C	Assesses Response Style
d'	Ability to discriminate between targets (non-X) and non-targets (X)
Omissions	Missed targets (non-X)
Commissions	Incorrect responses to non-targets (X)
Perseverations	Random, repetitive, or anticipatory responses (i.e., HRT < 100ms)
Hit Reaction Time (HRT)	Response Speed
HRT SD/Variability	Response Speed Consistency
HRT Block Change	Change in HRT across blocks of trials
HRT ISI Change	Change in HRT across ISIs

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CPT-3 Scores

Dimension	Score	Description
Inattentiveness	Detectability (d')	Ability to discriminate between targets (non-X) and non-targets (X)
	Omissions	Missed targets
	Commissions	Incorrect responses to non-targets
	Hit Reaction Time (HRT)	Response speed
	HRT Standard Deviation (SD)	Response speed consistency
	Variability	Variability of response speed consistency
Impulsivity	HRT	Response speed
	Commissions	Incorrect responses to non-targets
	Perseverations	Random or anticipatory responses (i.e., HRT < 100ms)
Sustained Attention	HRT Block Change	Change in response speed across blocks of trials
	Omissions by block	Missed targets by block
	Commissions by block	Incorrect responses to non-targets by block
Vigilance	HRT Inter-Stimulus Interval (ISI) Change	Change in response speed at various ISIs
	Omissions by ISI	Missed targets by ISI
	Commissions by ISI	Incorrect responses to non-targets by ISI

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Administration
Hardware and Software Requirements

- Intel Core i3 or equivalent performance (recommended)
- 2 GB Ram
- Windows XP or higher
- 1 available USB port
- 12" monitor or larger with minimum resolution of 1024 x768 pixels
- Wired mouse or keyboard

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

New Auditory Test of Attention

Conners Continuous Auditory Test of Attention (Conners CATA™)

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CATA Key Features

- Ages 8+
- Assesses auditory attention and attention problems
- Can be used on its own or as a compliment to the CPT-3 in an assessment battery
- 14 minutes, 200 scored trials, divided into 4 blocks
- Consists of two basic sounds: a low tone and a high tone
- On 80 percent of the trials, the low tone is played first followed by a high tone (warned trial). High tones on warned trials are the targets (AX paradigm)

CATA-Key Features

- On remaining 20 percent of the trials, a high tone is played alone without the low tone (unwarned trial). High tones on unwarned trials are non-targets.
- On most warned trials, the two tones are played sequentially in same ear (non-switch trial)
- On some warned trials, the two tones are played in opposite ears (switch trials)

What does the Conners CATA measure?

- Assesses *auditory processing* and *attention-related* problems in individuals aged 8 years and older
- Examines three dimensions of attention:
  1. Inattentiveness
  2. Impulsivity
  3. Sustained Attention
- Examines two dimensions of auditory processing:
  1. Auditory Laterality
  2. Auditory Mobility
- Validity Check
- Response Style Analysis:
  1. Liberal
  2. Conservative
  3. Balanced

Amy Patenaude, Ed.S., NCSP
1(800)456-3003 x331

Conners CATA Scores

Variable	Description
C	Assesses Response Style
d'	Ability to discriminate targets (warned high tone) from non-targets (unwarned high tone)
Omissions	Missed targets (warned high tone)
Commissions	Responded to non-targets (unwarned high tone)
Perseverative Commissions	Responded to low sound/Responded before the high sound
HRT	Hit React Time
HRT SD	Response Speed Consistency
HRT Block Change	Change in HRT across blocks
Laterality	HRT & Hits % Left vs. Right Ear (Preference for left vs. right targets)
Mobility	HRT &Hits% on Switch vs. Non Switch Trials (Ability to switch attention from one ear to another)

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CATA Scores

Dimension	Score	Description
Inattentiveness	Detectability (d')	Ability to discriminate targets (warned high tone) from non-targets (unwarned high tone)
	Omissions	Missed targets
	Commissions	Incorrect responses to non-targets
	Hit Reaction Time (HRT)	Response speed
	HRT Standard Deviation (SD)	Response speed consistency
Impulsivity	HRT	Response speed
	Commissions	Incorrect responses to non-targets
	Perseverative Commissions	Incorrect responses before targets
Sustained Attention	HRT Block Change	Change in response speed across blocks of trials
	Omissions by block	Missed targets by block
	Commissions by block	Incorrect responses to non-targets by block
Auditory Laterality	HRT & Hits% Left vs. Right Ear	Preference for left vs. right targets
Auditory Mobility	HRT & Hit% on Switch vs. Non Switch Trials	Ability to switch attention from one ear to the other

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Conners CPT 3 & Conners CATA

Standardization & Basic Psychometrics

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Sample Descriptions

Conners CPT-3

- Normative Sample:
  - *N* = 1,400 (700 male, 700 female)
  - Spread across the ages
  - 2010 Census Match: Race, Region, (Parental) Education Level
- ADHD Sample:
  - 259 children, 97 adults
  - 62% male
  - 60% medicated

Conners CATA

- Normative Sample:
  - *N* = 1,080 (540 male, 540 female)
  - Spread across the ages
  - 2010 Census Match: Race, Region, (Parental) Education Level
- ADHD Sample:
  - 193 cases
  - 64% male
  - 63% children (age 8-17)

Conners CPT 3 Split-half Reliability

Variable Type	Measure	Normative		Clinical	
		Children	Adults	Children	Adults
		N = 775–800	N = 591–600	N = 314-349	N = 134-145
Detectability	d'	.95	.92	.95	.94
Error Type	Omissions	.94	.96	.97	.95
	Commissions	.94	.91	.92	.95
	Perseverations	.90	.73	.95	.90
Reaction Time Statistics	HRT	.99	.99	.98	.99
	HRT SD	.96	.95	.97	.97
	Variability	.80	.73	.85	.79
	Block Change	.90	.91	.80	.91
	ISI Change	.90	.93	.91	.93
Response Style	C	.87	.83	.89	.92

Conners CPT 3 Test-retest Reliability

Variable Type	Measure	Corr* N =120
Detectability	d'	.74**
Error Type	Omissions	.83**
	Commissions	.85**
	Perseverations	.48**
Reaction Time Statistics	HRT	.89**
	HRT SD	.68**
	Variability	.56**
	HRT Block Change	.12
	HRT ISI Change	.66**
Response Style	C	.63**

*Range restriction corrections applied

Amy Patenaude, Ed.S., NCSP
1(800)456-3003 x331

CATA Split-half Reliability

Variable Type	Measure	Normative		Clinical	
		Children	Adults	Children	Adults
		N = 565–600	N = 462–480	N = 109-122	N = 66-71
Detectability	d'	.97	.98	.96	.93
Error Type	Omissions	.93	.94	.98	.97
	Commissions	.99	.99	.93	.88
	Perseverations	.99	.99	.99	.99
Reaction Time Statistics	HRT	.91	.93	.98	.99
	HRT SD	.86	.90	.81	.95
	Block Change	.96	.95	.90	.92
Response Style	C	.90	.93	.91	.90

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CATA Test-retest Reliability

Variable Type	Measure	Corr* N =120
Detectability	d'	.74**
Error Type	Omissions	.65**
	Commissions	.72**
	Perseverations	.95**
Reaction Time Statistics	HRT	.56**
	HRT SD	.63**
	HRT Block Change	.12
Response Style	C	.14

*Range restriction corrections applied

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Conners CPT 3 - Group Differences

ADHD vs General Population

Measure		ADHD	Matched Gen. Pop.	Cohen's *d*	*p*
		N = 341-346	*N* = 340-346		
d'	*M*	**-1.9**	**-2.3**	**0.43**	**< .001**
	SD	1.0	1.0		
Omissions	*M*	**4.6**	**3.1**	**0.25**	**.001**
	SD	6.2	6.2		
Commissions	*M*	**50.1**	**43.0**	**0.35**	**< .001**
	SD	20.3	20.3		
Perseverations	*M*	**1.2**	**0.5**	**0.38**	**< .001**
	SD	1.7	1.7		
HRT	*M*	**418.7**	**410.6**	0.10	.186
	SD	80.9	80.9		
HRT SD	*M*	**0.305**	**0.258**	**0.49**	**< .001**
	SD	0.095	0.095		
Variability	*M*	**0.085**	**0.069**	**0.42**	**< .001**
	SD	0.038	0.038		
HRT Block Change	*M*	**0.008**	**0.003**	**0.21**	**.002**
	SD	0.023	0.023		
HRT ISI Change	*M*	**0.068**	**0.059**	**0.22**	**.004**
	SD	0.042	0.042		

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Conners CATA - Group Differences

ADHD vs General Population

Score		ADHD	Matched General Population	F	p	Cohen's d
		N = 183-183	N = 190-193			
d'	M	-2.4	-3.2	36.6	<.001	0.57
	SD	1.5	1.3			
Omissions	M	6.8	5.4	1.2	.274	0.10
	SD	13.1	12.1			
Commissions	M	19.0	8.2	43.9	<.001	0.63
	SD	17.9	16.5			
Perseverative Commissions	M	7.7	3.8	7.6	.006	0.26
	SD	15.5	14.3			
HRT	M	693.6	658.1	2.9	.089	0.16
	SD	230.7	212.6			
HRT SD	M	0.350	0.303	13.8	<.001	0.35
	SD	0.140	0.129			
HRT Block Change	M	0.017	0.007	1.8	.182	0.13
	SD	0.082	0.077			

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

7 Step Interpretation Process

Step 1: Determine Validity of the Administration
Step 2: Review Response Style Analysis
Step 3: Examine the Overview of Scores
Step4: Review the Overall Summary and Clinical Likelihood
Step 5: Examine the Individual Dimensions of Attention
Step 6: Integrate Results with Multiple Sources
Step 7: Report Results

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CASE STUDY: GRANT

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Case Study

- Grant S.
- 10-year-old boy
- Fell behind in school work
- Often seemed distracted and had problems remembering learned materials
- Some ADHD in family history
- Tested for attention deficits using CPT 3 and CATA

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Assessment Plan

1. Clinician to review all available information
2. Obtain primary and differential diagnosis as well as to establish a general picture of Grant's mental and overall health status
3. Administer the following assessments: Conners CPT 3, Conners –March Developmental Questionnaire (CMDQ), Conners 3rd Edition (Conners 3-Parent, Teacher, Self), Conners CATA
4. Systematic clinical interview

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Case Study

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Case Study

- Step 1: Validity of Administration

Validity of Administration

The Conners CPT 3 performs a validity check based on the number of hits and omission errors committed, as well as a self-diagnostic check of the accuracy of the timing of each administration. If there is an insufficient number of hits to compute scores, and/or if the omission error rate exceeds 25%, these issues will be noted. Also, the program will issue a warning message noting that the administration was invalid if a timing issue is detected.

There was no indication of any validity issues; the current administration should be considered valid.

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Case Study

- Step 2: Response Style Analysis

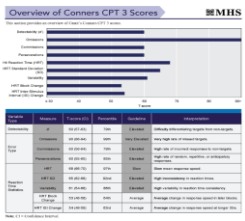
Response Style Analysis

The variable C represents an individual's natural response style in tasks that involve a speed-accuracy trade-off. Based on his or her score on this variable, a respondent can be classified as having one of the following three response styles: a **conservative** style (T-score ≥ 60) of responding that emphasizes accuracy over speed; a **liberal** style (T-score ≤ 40) of responding that emphasizes speed over accuracy; or a **balanced** style (T-score = 41-59) of responding that is sensitive to both speed and accuracy. Based on Grant's responses, **he has a conservative style of responding that emphasizes accuracy over speed** (**T-score = 60; 90% Confidence Interval = 54-66**). This response style is often associated with slower reaction times, more omission errors (failure to respond to targets), and fewer commission errors (incorrect responses to non-targets). The influence of Grant's conservative response style on other Conners CPT 3 scores should be taken into consideration throughout the interpretation process.

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

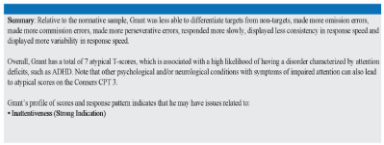
Step 3: Examine the overall profile



CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Step 4: Clinical Likelihood Statement



Summary Relative to the normative sample, Grant was less able to differentiate targets from non-targets, made more omission errors, made more commission errors, made more perseverative errors, responded more slowly, displayed less consistency in response speed and displayed more variability in response speed.

Overall, Grant has a total of 7 atypical T-scores, which is associated with a high likelihood of having a disorder characterized by attention deficits, such as ADHD. Note that other psychological and/or neurological conditions with symptoms of impaired attention can also lead to atypical scores on the Conners CPT 3.

Grant's profile of scores and response pattern indicates that he may have issues related to:
- **Inattentiveness (Strong Indication)**

CONNERS CPT 3 | CONNERS CATA

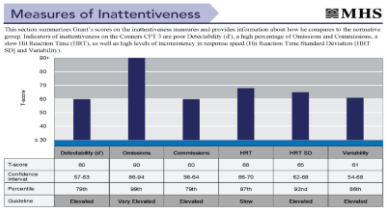
MHS ASSESSMENTS

Step 5: Examine the Individual Dimensions of Attention

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

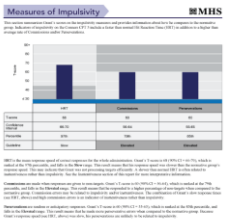
Step 5: Examine the Individual Dimensions of Attention



CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

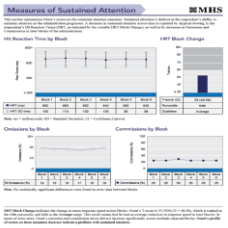
Step 5: Examine the Individual Dimensions of Attention



CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

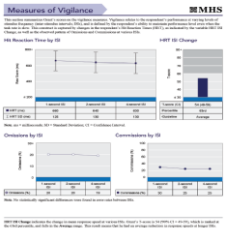
Step 5: Examine the Individual Dimensions of Attention



CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Step 5: Examine the Individual Dimensions of Attention



CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Step 6: Integrate Results from Multiple Sources

- **CPT3:** problems with inattentiveness
- **CMDQ:** Grant's Uncle diagnosed with ADHD.
- **Conner 3 (P, T, S)**: Results suggest problems with inattention. Impairment items related to schoolwork/grades were endorsed.
- **Conners CATA:** problems with inattentiveness
- **Interview:** difficult to get Grant to conduct homework, careless when following instructions. Described Grant as shy and anxious in some situations.
- **Observations:** Observations during assessment corroborated reports.
- **Diagnosis:** Utilizing this combined information to guide diagnosis, the clinician decided that Grant met criteria for a primary diagnosis of ADHD Predominantly Inattentive Presentation.

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

Progress Monitoring

Table 4.9. Conners CPT 3 Pre- and Post-Treatment Scores for Grant S.

Conners CPT 3 Scores	Pre-treatment Evaluation (Time 1)		Post-treatment Evaluation (Time 2)		Statistical Change
	T-score	Classification	*T*-score	Classification	
d'	62	Elevated	58	High Average	Time 1 = Time 2
Omissions	74	Very Elevated	58	High Average	Time 1 > Time2*
Commissions	72	Very Elevated	61	Elevated	Time 1 > Time 2*
Perseverations	65	Very Elevated	54	Average	Time 1 > Time 2
HRT	68	Slow	58	A Little Slow	Time 1 > Time 2*
HRT SD	71	Very Elevated	61	Elevated	Time 1 > Time 2
Variability	65	Elevated	60	Elevated	Time 1 = Time 2
HRT Block Change	52	Average	62	Elevated	Time 1 < Time 2
HRT ISI Change	52	Average	63	Elevated	Time 1 < Time 2

Note. The ">" and "<" symbols indicate scores that are statistically significant ($p < .10$) and/or at least 10 *T*-score points apart. Statistically significant changes are denoted by the * symbol.

CONNERS CPT 3 | CONNERS CATA

MHS ASSESSMENTS

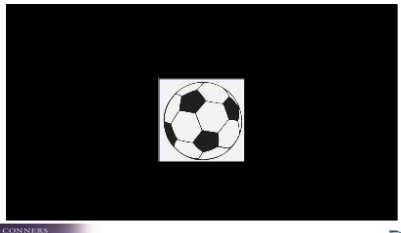
CATA Report

- Very similar structure to the CPT 3 report
- Offers additional information about auditory laterality and mobility

K-CPT 2

- For age 4-7
- 7.5 minutes; 200 trials + 1 dummy trial
- Pictures of objects familiar to young children.
- 75% targets (everything except soccer ball)
- Presentation speed (Inter Stimulus Interval) can vary: 1.5 or 3.0 seconds
- Results can by broken down into blocks: 5 blocks with 40 trials each
- Dimensions of Attention Measured:
  1) Inattentiveness
  2) Impulsivity
  3) Sustained Attention (new)
  4) Vigilance (new)

Old K-CPT: Black Background



Amy Patenaude, Ed.S., NCSP
1(800)456-3003 x331

K-CPT 2: White background

K-CPT 2 vs. CPT 3

	K-CPT 2	CPT 3
Admin Time	7.5 minutes	14 minutes
Stimuli	Pictures of common objects	letters
ISIs	1.5 & 3 seconds	1, 2, & 4 seconds
Stimuli Display Time	500ms	250ms

References

Conners, K. (2014). Conners Continuous Performance Test 3rd Edition and Conners Continuous Auditory Test of Attention: Manual. Toronto, Ontario, Canada: Multi-Health Systems.

Dawson, P. (2014). Best practices in assessing and improving executive skills. In P. Harrison, & A. Thomas, Best practices in school psychology student-level services (pp. 269-286). Bethesda, MD: National Association of School Psychologists.

Goldstein, S. & Naglieri, J. A. (2013). Comprehensive Executive Function Inventory (CEFI):Technical manual. Toronto, Ontario, Canada: Multi-Health Systems.

Tobin, R., Scheider, W. & Landau, S.(2014). Best practices in the assessment of youth with attention deficit hyperactivity disorder within a multitiered services framework. In P. Harrison, & A. Thomas, Best practices in school psychology data-based and collaborative decision making (pp. 391-404). Bethesda, MD: National Association of School Psychologists.

MHS