Evidence-Based Assessment of Autism Spectrum Disorder within the Context of Interprofessional Practice

Cullowhee Conference
March 17, 2022

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1. Brief update on ASD - general overview of assessment framework
2. Key tenets of evidence-based assessment (EBA)
3. EBA - Screening and diagnosis
4. BREAK.
5. EBA – Intervention planning and monitoring
6. Key tenets of interprofessional practice.
7. Project INTERACT.
8. Concluding comments. Q&A.

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Acknowledgements

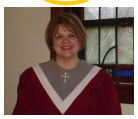
Project INTERACT Team
Bill Ogletree, Professor, CSD

Amy Rose, Professor, CSD

Johanna Price, Professor, CSD

Karena Cooper-Duffy, Professor, SPED

Yours truly, Professor, PSY



Machelle Cathey, Coordinator and Patron Saint, Project INTERACT

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Acknowledgements

Maryellen Brunson McClain, PhD, NCSP, LP

Bryn Harris, PhD, NCSP, LP

UtahStateUniversity

University of Colorado Denver

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- Brief update on ASD - General overview of assessment framework
- Prevalence and Co-occurring Educational and Psychological Concerns
- Key Tenets of Evidence-Based Assessment
- Introduce Comprehensive, Developmental, Evidence-based Assessment framework

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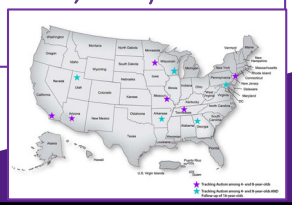
Current Prevalence Estimates

1 in 59, *4-year-olds* (Shaw et al., 2021)

3.4:1 Male : Female ratio

1 in 44, *8-year-olds* (Maenner et al., 2021)

4.2:1 Male : Female ratio



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Neurocognitive Functioning

Intellectual disability – historical estimates
- 50-70% for all ASDs and 75-80% AUT.

Recent reports much lower % of ID

- 30 - 35.2% ID range (2014, 2016, 2018 data from CDC).
- 41.7 - 46% Average or greater (CDC, 2014, 2016, 2018 data).

Sensory abnormalities (hypo / hyper) –visual, sound, tactile, olfactory, taste

10% *savant skills* (talented v. prodigious).

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Neurocognitive / Academic Concerns

ADHD

High rates of comorbidity – 21-30 % (Rosen et al., 2018).

Motor difficulties (Bodison & Mostofsky, 2014)

Learning disabilities – up to 67% (Bauminger-Zviely, 2014).

Executive functioning (planning, organization, self-regulation, inhibition)

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Comorbid Psychological Difficulties

Anxiety and Depression most common
- ~ 56% of all ASDs in Howlin's (2004) review of 200 individuals with ASD
- More recently:
  - *Anxiety* roughly 40% (Rosen et al., 2018)
  - *Depression* – 29% of children and 77% adults (Rosen et al.)

Externalizing disorders (Rosen et al.)
- Oppositional defiant disorder – 28%
- Conduct disorder – 3%

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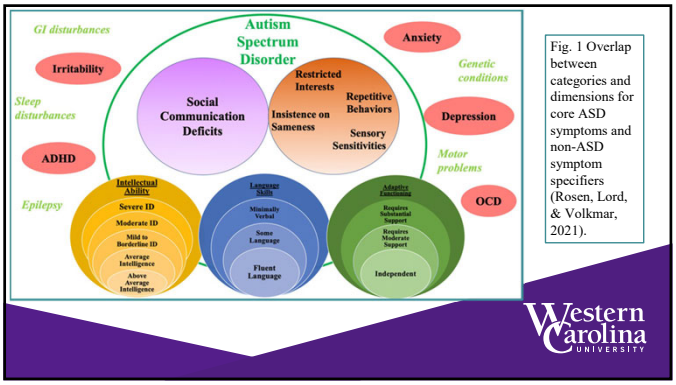

Fig. 1 Overlap between categories and dimensions for core ASD symptoms and non-ASD symptom specifiers (Rosen, Lord, & Volkmar, 2021).

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Purposes of Assessment

Screening.

Diagnosis / Identification.

-Including identifying co-occurring conditions.

Educational and intervention planning.

Educational and intervention monitoring.

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Tenets of Evidence-Based Assessment (EBA)

- Movement from evidence-based medicine – influenced psychological therapies first (ESTs).
- Basic premise –use assessment techniques and interpretive strategies that are based on sound scientific evidence. (What a concept!)

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Psychometric concepts informing EBA

- *Reliability.*
  - *Internal consistency* – within scale – do items on a scale "hang together?"
  - *Temporal stability* - stable over time – does test yield similar result over repeated uses?
  - *Interrater reliability* - across users – does test produce similar results across users?

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Psychometric concepts informing EBA

- *Validity.*
  - How useful? Does it do what it's designed to do?
  - How well does test measure what it purports to measure?
  - Content; construct; criterion / concurrent / convergent; discriminant / divergent; predictive; incremental; etc.

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Psychometric concepts informing EBA

- *Standardization.*
  - What sample is used to standardize the measure?
  - How representative of the population to be used with?
  - Stratified per age; gender; race/ethnicity; etc. (e.g., US census data)
- *Norming.*
  - Are appropriate statistical procedures used to develop normative scores?

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Standards for acceptable psychometrics (Bracken, 1987)

- Internal consistency reliability:
  - Total test = .90 or >
  - Screening = .80 or >
  - Median subtest = .80 or >
- Temporal stability reliability:
  - Total test = .90 or > (2-4-week interval)
  - Median subtest = ?
- Validity: No absolute criteria exist.

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Other Proposed Standards (Cicchetti, 1994)

- Internal consistency reliability:
  - < .70 = unacceptable
  - .70 - .79 = fair
  - . 80 - .89 = good
  - .90 and > = excellent
- Interrater reliability (e.g., kappa):
  - < . 40 = poor
  - .40 - .59 = fair
  - .60 - .74 = good
  - .75 and > = excellent

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Screening

- Definition:
  - Identification of unrecognized problems via brief measures to differentiate between those who probably have a disorder from those who probably do not (Derogatis & Dellapietra)
- Purpose:
  - Identify those persons who are a greater risk for a problem versus yielding a diagnosis (Satz & Fletcher)
- Early screening built on notion that early detection leads to earlier intervention and improved outcomes

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Evaluating Screening Tests

- Brevity – should be quick
- Cost – should be inexpensive
- User qualifications – should not require extensive expertise
- Psychometrics
  - Should be reliable
  - Should be valid – PREDICTIVE
  - Validity assessed in variety of ways

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Evaluating Screening Tests

- Types of validity statistics:
  - Overall hit rate – correct classification of sample
  - Sensitivity – correct detection of disorder
  - Specificity – correct exclusion of disorder
  - Positive predictive value (PPV) – % of screening hits who have disorder
  - Negative predictive value (PPV) - % of screening misses who do not have disorder

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An Example (1,000 cases screened, prevalence = .05 (ASD ~.023)

	Disorder	No Disorder	
Screen +	True positive 40	False positive 95	PPV 40/135 = .30
Screen -	False negative 10	True negative 855	NPV 855/865 = .99
	Sensitivity 40/50 = .80	Specificity 855/950 = .90	Hit rate 40 + 855/1000 = .90

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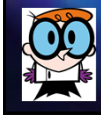

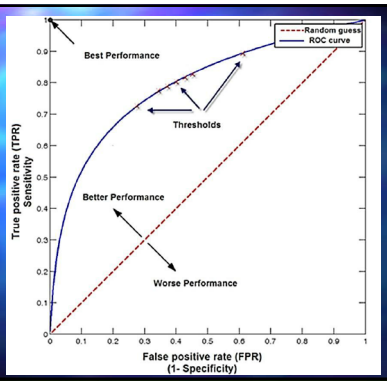

AUC interpretive guidelines:

Probability of correctly classifying pair of individuals, one with ASD and one without ASD.

1.0 = Perfect
≥ .90 = Excellent
≥ .80 = Good
≥ .70 = Fair
< .70 = Poor

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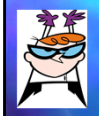
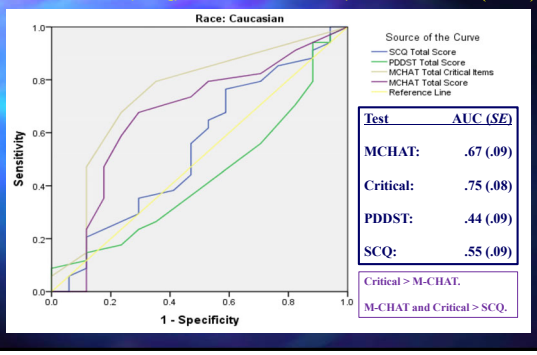
M-CHAT, M-CHAT Critical, SCQ, PDDST-II Total Scores, White/Caucasian (*n* = 51)





Test	AUC (*SE*)
MCHAT:	.67 (.09)
Critical:	.75 (.08)
PDDST:	.44 (.09)
SCQ:	.55 (.09)

Critical > M-CHAT.

M-CHAT and Critical > SCQ.

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Guidelines for Selection of "Cut-off" Scores

- How do you determine where to place cut-off score?
- Sensitivity, Specificity, hit rate ≥ .80 (Carran & Scott, 1992).
- Referral rate 3 times higher than base rate (Lichtenstein & Ireton, 1991).
- Point on ROC curve that comes closest to left-hand corner (Ehlers, Gillberg, & Wing, 1999).
- Cut off too conservative – miss too many with problem (false negative).
- Cut off too liberal – identify too many without a problem (false positive).

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Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003)

- ASD screening instrument.
- 40 items completed by parent or caregiver.
- Items in Yes / No format. (e.g., "*Has he ever got his pronouns mixed up (e.g., saying you or he for I?*" "*When she was 4 to 5, did she nod her head to mean no?*")
- Current form and Lifetime form.
- Used with children 4.0 or older with 'mental age' of 2.0 or higher.
- Item content linked to the Autism Diagnostic Interview-Revised (ADI-R).

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Social Communication Questionnaire (SCQ; Rutter, Bailey, & Lord, 2003)

- Raw score of 15 or higher on Lifetime form is a positive screen.
- Reliability evidence.
  - All items correlate with total score (r = .26 - .73).
- Validity evidence (Rutter et al., 2003).
  - Items discriminate between ASD and non-ASD.
  - Correlates .71 with ADI-R total scores.
  - AUCs range from .86 to .94 distinguishing between ASD and ID.
- External validation review (Norris & Lecavalier, 2010).
  - Consistently better sensitivity values than specificity.

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Modified Checklist for Autism in Toddlers, Revised with Follow-up (M-CHAT-R/F; Robins, Fein, & Barton, 2009)

- Screening instrument based on CHAT.
- For use with 16- to 30-month-olds.
- Two parts – Checklist and Follow-up Interview
- Checklist consists of 20 items completed by caregiver.
- Follow-up interview used to clarify caregiver responses.
- Content – pretend play; joint attention; social interest, among others.
- Items in Yes / No format. (e.g., "*Does your child play pretend or make-believe?*" "*Does your child point with one finger to show you something interesting?*").

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- The M-CHAT-R/F is freely available and includes scoring templates and Excel software. https://mchatscreen.com/
- The follow-up interview is designed to reduce false positives.
- The M-CHAT-R/F has been translated into over 50 languages.
- Meets 18- and 24-month ASD screening recommendations from AAP (see https://brightfutures.aap.org/Pages/default.aspx).
- Internal consistency = .79.

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M-CHAT-R Total score <3 → No follow-up needed unless surveillance or other procedure suggests risk for ASD

Total score = 3–7 → Administer M-CHAT-R Follow-up → Total score ≥2 on M-CHAT-R/F: refer for diagnostic evaluation & early intervention

Total score ≥8 → Bypass Follow-up; Refer immediately for diagnostic evaluation & early intervention

Robins, D. L., Casagrande, K., & Barton., Chen, A., Chi-Ming., Dumont-Mathiel., T., & Fein, D. (2014). Validation of the modified checklist for Autism in toddlers, revised, with follow-up (M-CHAT-R/F). *Pediatrics, 133*, 37 – 45.

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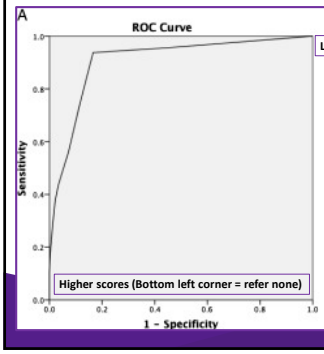

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Lower scores (Top right corner = refer all)

AUC = 0.907

Cutoff on M-CHAT-R/F Total Score	Sensitivity	Specificity
1	0.96	0.56
2	0.94	0.83
3	0.73	0.89
4	0.56	0.93
5	0.44	0.97
6	0.38	0.98
7	0.28	0.99
8	0.18	0.99
9	0.14	0.99

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Comprehensive, Developmental, Evidence-based Approach (Klin et al., 2005)

Assessment of multiple areas
- Cognitive, Behavioral, Functional

Developmental perspective
- Grounded in intellectual development

Variability of skills and performance across settings

Functional adjustment (i.e., adaptive)

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General Areas to be Assessed (Klin et al., 2005)

Verbal and Nonverbal Cognitive Functioning

Language

Adaptive Behavior

Social Communication

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Table 1. *Recommended Measures of a Core Assessment Battery for Autism Spectrum Disorders* (Ozonoff et al., 2005)

Measure	Format	Age Range[a]	Administration/ Completion Time	Training Needs[b]
Autism Diagnosis: Parent Report				
ADI–R	Interview	18 months to adult	1 to 2.5 hr	Intensive
SCQ	Questionnaire	4 years to adult	10 min	Minimal
PIA	Questionnaire	2 to 6 years	20 to 30 min	Minimal
PDDBI	Questionnaire	1 to 17 years	10 to 15 min	Minimal
Autism Diagnosis: Direct Observation				
ADOS	Direct Testing	2 years to adult	30 to 50 min	Intensive
CARS	Observation	2 years to adult	5 to 10 min	Moderate
Intelligence				
Mullen	Direct Testing	Birth to 68 months	15 to 60 min	Moderate
DAS	Direct Testing	2.5 to 17 years	25 to 65 min	Moderate
WISC–IV	Direct Testing	6 to 16 years	50 to 70 min	Moderate
Stanford–Binet 5	Direct Testing	2 to 85 years	45 to 75 min	Moderate
Leiter–Revised	Direct Testing	2 to 20 years	25 to 90 min	Moderate
Language				
CELF	Direct Testing	3 to 21 years	30 to 45 min	Moderate
PPVT	Direct Testing	2.5 to 90+ years	10 to 15 min	Moderate
EOWPVT	Direct Testing	2 to 18 years	10 to 15 min	Moderate
TLC	Direct Testing	5 to 18 years	< 60 min	Moderate
CCC	Questionnaire	5 to 17 years	10 to 15 min	Minimal
Adaptive Behavior				
Vineland	Interview	Birth to 18 years	20 to 60 min	Moderate

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Autism Diagnostic Observation Schedule-2 (Lord et al., 2012)

Designed for diagnosis and classification.

Semi-structured, standardized assessment instrument that samples:

- Communication;
- Social interaction;
- Imaginative play and use of objects;
- Repetitive or stereotypic movements / interests.

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Autism Diagnostic Observation Schedule-2 (Lord et al., 2012)

The instrument is built on planned social occasions, or "presses," where deficits are likely to appear, e.g., pretend play; spontaneous communication.

Designed to minimize expressive language skills; that is, to assess areas of functioning that are beyond language delay.

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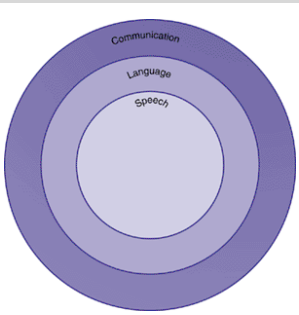

From Paul, R. (2007). Disorders of communication. In F. Volkmar & A. Martin (Eds.), *Lewis's Child and Adolescent Psychiatry: A Comprehensive Textbook (4th ed).*

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Autism Diagnostic Observation Schedule-2 (Lord et al., 2012)

- Behavior is coded within multiple areas.
- Codes used to formulate a diagnosis through algorithm.
- No information regarding onset.
- ADOS-2 classification of autism does not automatically equal a diagnosis of autism.
- Also features Comparison Score that allow to track changes in ADOS-2 scores over time and across modules (except Module 4).
- Comparison Score ranges from 1 (Minimal) to 10 (High).

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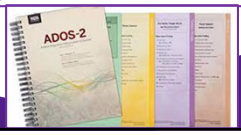
Five modules for language and/or age:

- Toddler: Age 12-30 mo. No speech to simple phrases.
- Module 1: Age >31 mo. No speech to simple phrases.
- Module 2: Simple phrases (30-month) to verbal fluency (4 y.o.).
- Module 3: Verbally fluent child to younger adol. (under 12-16).
- Module 4: Verbally fluent adolescent or adult (above 16).



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CARS-2 (Schopler et al., 2010; WPS)

Two versions:
CARS-2 Standard Version (CARS-ST).
Younger than 6; and
Older with below average IQ and communication.
CARS-2 High Functioning Version (CARS-HF).
6 years and older and IQ > 80.

New parent/caregiver report – CARS-2: Questionnaire for Parents or Caregivers (CARS-2-QPC) – parent report, no scoring.

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CARS2-ST and CARS2-HF consist of 15 items and yield "Severity Group" score:

Minimal or no symptoms of ASD.
Mild-to-moderate symptoms of ASD.
Severe symptoms of ASD.

Both versions yield comparison with individuals with ASD (clinical sample of 1,034) – presented as T scores (*M* = 50; *SD* = 10).

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Social Responsiveness Scale (SRS) and SRS-2 (Constantino & Gruber, 2005; 2012)

- Designed to aid in diagnosis, intervention planning, and intervention monitoring.
- Set of rating scales of symptoms associated with ASD; 65 Likert-items for each of four forms
- Four forms:
  - Preschool form (2.5 – 4.5 yr)
  - School-age form (4 – 18 – same items on SRS)
  - Adult form (19 and up; 3rd-party rater-relative)
  - Self-report form for adults (19 and older)
- Total of 1,963 individuals across 4 forms.

SRS-2
Social Responsiveness Scale – Second Edition

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Index scores (to align with DSM-5):
Social Communication and Interaction.
Restricted Interests and Repetitive Behavior.

Five "Treatment" Subscales:
Social Awareness
Social Cognition
Social Communication
Social Motivation
Restricted Interests and Repetitive Behavior

SRS-2
Social Responsiveness Scale – Second Edition

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Item groupings via expert judgment – i.e., rationally derived – 'design, implement, evaluate treatment.'

Social Awareness – ability to pick up on social cues.

Social Cognition – interpret social cues.

Social Communication – expressive social communication.

Social Motivation – motivation to engage in social behavior.

Restricted Interests/Repetitive Behavior – RRBI.

SRS-2
Social Responsiveness Scale – Second Edition

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SRS-2 Psychometrics (manual)

Parent/teacher standardization: N = 1,014; 2009 census.

Reliability (School-age form; 4 - 18 year olds).
Internal consistency (Total): α = .95-.96
Interrater reliability (Parent-Teacher): r = .61

Parent form: clinical sample, N = 4,891; unaffected sibs, N = 3,030 – Interactive Autism Network (IAN)

Reliability. Clinical: α = .95; Siblings: α = .97
Validity. Clinical *MRaw* = 107; Sibs *MRaw* = 25.
ROC curve analysis: AUC = .97

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Initial Evaluation of the Gilliam Autism Rating Scale-3 (GARS-3; Gilliam, 2014) in a Clinical Sample (Hastings & Campbell, 2015). [A cautionary note!]

Participant Characteristics (N = 20)

Variable	n	%	Min	Max	M	SD
Gender						
Male	16	80				
Female	4	20				
Race						
Caucasian	16	80				
African-American	3	15				
Other	1	5				
Ethnicity						
Non-Hispanic	19	95				
Hispanic	1	5				
Diagnosis						
ASD	12	60				
Non-ASD	8	40				
Age (yr)			3.25	22.7	8.23	5.6
IQ score			46	112	80.0	20.4

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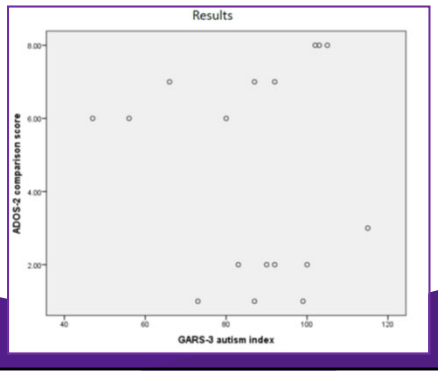

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Correlations between GARS-3 Index, CARS-2 T and Raw scores, and ADOS-2 Comparison scores (N=20)

	GARS-3	CARS-2 Raw	CARS-2 T	ADOS-2 Comp [a]
GARS-3	---			
CARS-2 Raw	-.10	---		
CARS-2 T	-.09	.97**	---	
ADOS-2 Comp [a]	-.08	.67**	.65**	---

Note: [a] = For ADOS-2 Comparison correlations, *n* = 17. ** = Correlation is significant at the .01 level.

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Harris et al. (2014) Autism Assessment Study

- Authors conducted a comprehensive review of Autism assessments pertaining to culturally and linguistically responsive psychometrics and design
- Diagnostic tools assessed: ADOS, ADI-R, ASRS, CARS-2
- Screening tools assessed: ASQ:SE, ASSQ, GARS, M-CHAT, Q-CHAT, SCQ
- Findings: Autism screening tools had higher checklist scores than Autism diagnostic tools, practitioners need stronger tools for cultural and linguistic minoritized (CLM) populations

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Psychometrics of Autism Assessments

- Mainly standardized with White, middle to upper class males
- Small samples of racially/culturally minoritized children
- All Spanish language Autism-specific diagnostic assessments are direct translations, not standardized
- What about other languages?
- Extremely limited research in this area

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Psychometrics of Common Autism Tools

ASD Assessments Analyzed	Sample Size	African American	Latinx	White
Autism Spectrum Rating Scale (ASRS)-Short & Long Version for Teachers 2-5/6-18	1631	14.9	16.1	59.2
Autism Spectrum Rating Scale (ASRS)-Short & Long Version for Parents 2-5/6-18	1624	14.8	15.6	61
Gilliam Autism Rating Scale (GARS-3)	1107	12	10	80
Gilliam Autism Rating Scale (GARS-3)- Spanish	100	0	100	0
Social Responsiveness Scale (SRS-2)- School Age 4-18	1014	15.8	16.6	59.5
Social Responsiveness Scale (SRS-2)- Pre-School 2.5-4.5	247	14.2	16.6	64.4
Social Responsiveness Scale (SRS-2)- Adult	702	14.4	13.8	69.4
Social Responsiveness Scale (SRS-2)- Adult Self Report	702	14.4	13.8	69.4
Childhood Autism Rating Scales (CARS-2)- Standard Version	1034	16.2	12.7	60.5
Childhood Autism Rating Scales (CARS-2)- High Functioning Version	994	13.9	6.5	72.8
Childhood Autism Rating Scales (CARS-2)- Questionaire for Parents/Caregivers	Not Reported	Not Reported	Not Reported	Not Reported
Autism Diagnostic Interview-Revised (ADI-R)	50	Not Reported	Not Reported	Not Reported
Checklist for Autism Spectrum Disorder (CASD)	2469	Not Reported	Not Reported	Not Reported
The Autism Diagnostic Observation Schedule ADOS-2 Module 1-4	1619	11	4	80

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Included in Validation
Not Included in Validation

ASD Assessments Analyzed	Reliability				Validity		
	Internal Consistency	Test-Re-Test	Inter-rater	Split-Half	Contruct Validity	Criterion Validity	Structural Validity
Autism Spectrum Rating Scale (ASRS)-Short Version for Teachers 2-5							
Autism Spectrum Rating Scale (ASRS)-Short Version for Parents 2-5							
Autism Spectrum Rating Scale (ASRS)-Short Version for Parents 6-18							
Autism Spectrum Rating Scale (ASRS)-Short Version for Teachers 6-18							
Autism Spectrum Rating Scale (ASRS)-Long Version for Teachers 2-5							
Autism Spectrum Rating Scale (ASRS)-Long Version for Parents 2-5							
Autism Spectrum Rating Scale (ASRS)-Long Version for Parents 6-18							
Autism Spectrum Rating Scale (ASRS)-Long Version for Teachers 6-18							
Gilliam Autism Rating Scale (GARS-3)							
Gilliam Autism Rating Scale (GARS-3)- Spanish							
Social Responsiveness Scale (SRS-2)- School Age 4-18							
Social Responsiveness Scale (SRS-2)- Pre-School 2.5-4.5							
Social Responsiveness Scale (SRS-2)- Adult							
Social Responsiveness Scale (SRS-2)- Adult Self Report							
Childhood Autism Rating Scales (CARS-2)- Standard Version							
Childhood Autism Rating Scales (CARS-2)- High Functioning Version							
Childhood Autism Rating Scales (CARS-2)- Questionaire for Parents/Caregivers							
Autism Diagnostic Interview-Revised (ADI-R)							
Checklist for Autism Spectrum Disorder (CASD)							
The Autism Diagnostic Observation Schedule ADOS-2 Module 1							
The Autism Diagnostic Observation Schedule ADOS-2 Module 2							
The Autism Diagnostic Observation Schedule ADOS-2 Module 3							
The Autism Diagnostic Observation Schedule ADOS-2 Module 4							

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General Comments about Diagnostic Assessment (Campbell et al., 2014)

Multidisciplinary

Multi-domain and multi-informant

'Gold standard' measure(s)

No single measure = ASD

Identify comorbidities

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Clinical Example

- Boy, 11 years old
- No prenatal, perinatal complications
- Walked 12 months, single words 18 months, 2-word phrases by age 36 mos
- First eval @ 3 yr, 7 mo:
- Repetitive behavior (open/close dryer door), repetitive toy play, sensory sensitivities (noises; clothing), solitary play
- Aggressive; clumsy
- Diagnosis of Autistic Disorder (ADOS, CARS, SCQ)
- Cognitive, language, adaptive delays

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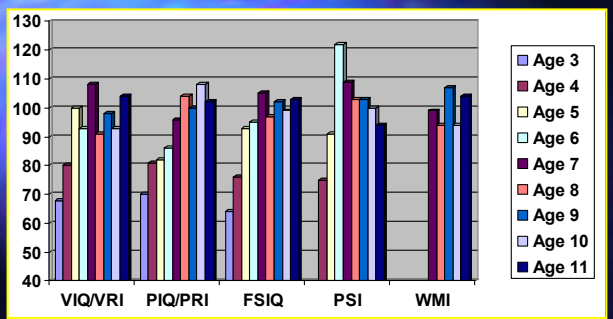
Cognitive Functioning



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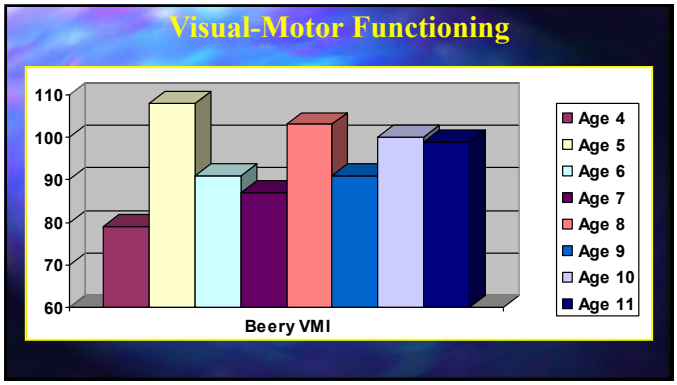
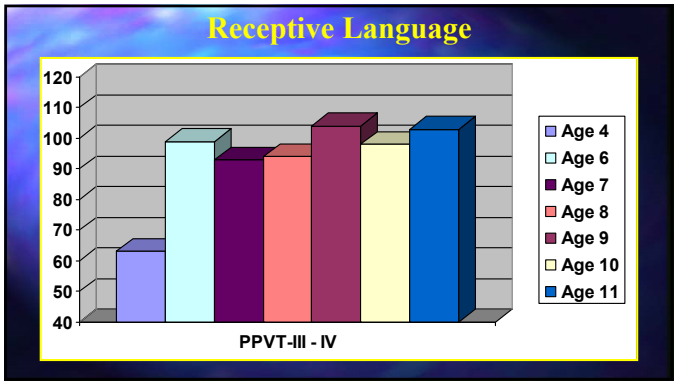

Visual-Motor Functioning
110
100
90
80
70
60
Beery VMI
Age 4
Age 5
Age 6
Age 7
Age 8
Age 9
Age 10
Age 11

55


Receptive Language
120
110
100
90
80
70
60
50
40
PPVT-III - IV
Age 4
Age 6
Age 7
Age 8
Age 9
Age 10
Age 11

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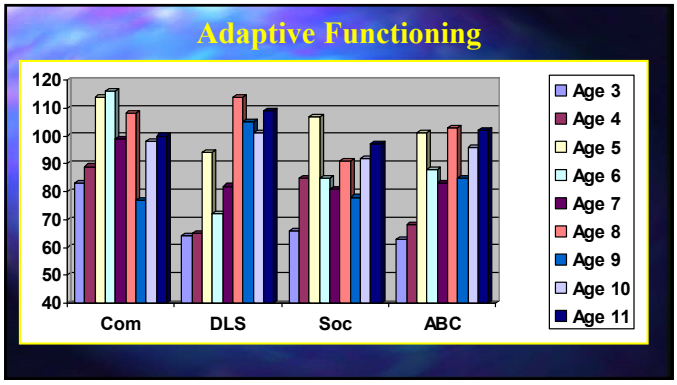
Adaptive Functioning
120
110
100
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80
70
60
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Com
DLS
Soc
ABC
Age 3
Age 4
Age 5
Age 6
Age 7
Age 8
Age 9
Age 10
Age 11

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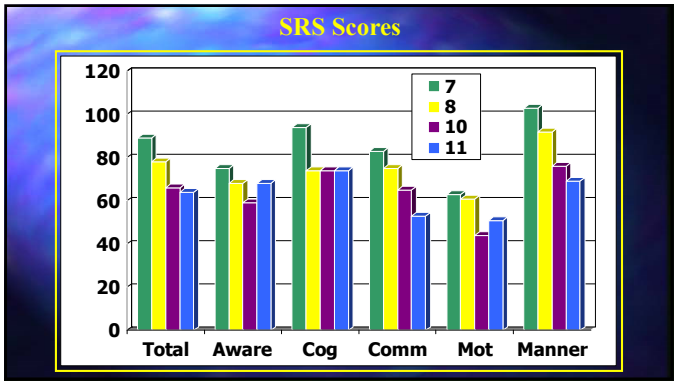

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References

Campbell, J. M., Ogletree, B. T., Rose, A. J., & Price, J. (2020). Interdisciplinary evaluation of Autism Spectrum Disorder. In M. M. Verdoes, J. D. Shahidullah, and K. R. Mezher (Eds.), Interdisciplinary Care Coordination for Youth with Autism Spectrum Disorder (pp. 47-63). Springer.

Campbell, J. M., Ruble, L. A., & Hammond, R. K. (2014). Evidence-based assessment of autism spectrum disorders. In L. A. Wilkinson (Ed.), Autism spectrum disorders in children and adolescents: Evidence-based assessment and intervention (pp. 51-73). Washington, DC: American Psychological Association.

Klin, A., Saulnier, C., Tsatsanis, K., & Volkmar, F. R. (2005). Clinical evaluation in autism spectrum disorders: Psychological assessment within a transdisciplinary framework. In F. R. Volkmar, R. Paul, A. Klin, & D. Cohen, Eds., Handbook of autism and pervasive developmental disorders (3rd ed.), (pp. 772-798). Wiley.

Lord, C., Rutter, M., DiLavore, P., Risi, S., Gotham, K., & Bishop, S. (2012). Autism Diagnostic Observation Schedule, Second Edition (ADOS-2) Manual. Torrance, CA: Western Psychological Services.

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Maenner, M. J., Shaw, K. A., Bakian, A. V., et al. (2021). Prevalence and characteristics of autism spectrum disorder among children aged 8 years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2018. *MMWR Surveillance Summaries, 70 (No. SS-11), 1-16.*

Ozonoff, S., Goodlin-Jones, B. L., & Solomon, M. (2005). Evidence-based assessment of autism spectrum disorders in children and adolescents. Journal of Clinical Child and Adolescent Psychology, 34, 523-540. doi:10.1207/s15374424jccp3403_8

Rosen, T. E., Mazefsky, C. A., Vasa, R. A., & Lerner, M. D. (2018). Co-occuring psychiatric conditions in autism spectrum disorder. International Review of Psychiatry, 30, 40-61. doi: 10.1080/09540261.2018.1450229

Shaw, K. A., Maenner, M. J., Bakian, A. V., et al. (2021). Early identification of autism spectrum disorder among children aged 4 years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2018. *MMWR Surveillance Summaries, 70 (No. SS-10), 1-14.*

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Interprofessional Collaboration (IPC): Professionals from different disciplines work together and learn from each other during service provision

Interagency Collaboration (IAC): Professionals from different agencies collaborate during service provision

Interprofessional Interagency Collaboration (IIC): Professionals from different disciplines *and* agencies collaborate during service provision

Azad et al., 2021; McClain et al., 2021; Shahidullah et al., 2018; WHO, 2010

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Why Collaborate?

- More effective, efficient, and family/provider satisfaction
- Professional expectations
- Autism is complex
- Co-occurring concerns
- Improves equity
- Higher quality evaluations

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Levels of Collaboration

Level 1:

Communication

- Share info
- Review of records
- Phone calls, email, in-person
- Usually 1x

Level 2:

Care Coordination

- Deliberate organization patient care activities
- Within and across agencies
- Streamlined processes (e.g., family navigation)

Level 3: Collaboration

- 2+ providers
- Plan, problem solve student outcomes
- School-based autism team embedded with developmental specialists or clinic-based autism evaluation team with embedded school personnel

Gardner et al., in press

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Barriers to collaboration between school and community

School	Community
• Community provider school/SPED system knowledge • Confidential records sharing • Difficulties accessing community supports	• Administration • Time • Reimbursement • School provider autism expertise • Community provider school/SPED system knowledge • Confidential records sharing

Azad et al., 2021; McClain et al., 2020

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Facilitators to collaboration between school and community

School	Community
• Valuing shared decision-making • Establish collaboration methods • Community provider school/SPED system knowledge	• Administration supports • Easy information sharing • Schedule coordination • School provider training in autism • Community provider school/SPED system knowledge

Azad et al., 2021; McClain et al., 2020

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Successful Engagement: School Psychology Training

Graduate training, especially practica experiences

Interprofessional education professional development

Increase autism evaluation skills

Strong understanding of the roles and contributions of different disciplines

Seek mentorship from more experienced school psychologists

Azad et al., 2021; McClain et al., 2021; McClain et al., 2020

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References

Azad, G., McClain, M. B., Haverkamp, C., Maxwell, B., & Shahidullah, J. D. (2021). Interagency collaboration for pediatric autism spectrum disorder: Perspectives of community-based providers. *Journal of Interprofessional Education & Practice*, 100433.

Beers, A. N., McBoyle, M., Kakande, E., Santos, R. C. D., & Kozak, F. K. (2014). Autism and peripheral hearing loss: a systematic review. *International Journal of Pediatric Otorhinolaryngology*, *78*(1), 96-101.

Gardner, L., Campbell, J.M., Gilchrest, C., McClain, M.B., & Shahidullah, J.D. (in press). Identification of autism spectrum disorder and interprofessional collaboration between school and clinical settings. *Psychology in the Schools.*

McClain, M. B., Shahidullah, J. D., Harris, B., McIntyre, L. L., & Azad, G. (2021). Reconceptualizing educational contexts: The imperative for interprofessional and interagency collaboration in school psychology. *School Psychology Review*, 1-13.

McClain, M. B., Shahidullah, J. D., Mezher, K. R., Haverkamp, C. R., Benallie, K. J., & Schwartz, S. E. (2020). School-clinic care coordination for youth with ASD: A national survey of school psychologists. *Journal of autism and developmental disorders*, *50*(9), 3081-3091.

Shahidullah, J. D., Azad, G., Mezher, K. R., McClain, M. B., & McIntyre, L. L. (2018). Linking the medical and educational home to support children with autism spectrum disorder: Practice recommendations. *Clinical pediatrics*, *57*(13), 1496-1505.

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Project INTERACT

Interprofessional Preparation Grant

https://affiliate.wcu.edu/projectinteract/

US DEPARTMENT OF EDUCATION PERSONNEL PREPARATION GRANT - FOCUS AREA: (B) PREPARING PERSONNEL TO SERVE SCHOOL-AGE CHILDREN WITH DISABILITIES WHO HAVE HIGH-INTENSITY NEEDS

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Project INTERACT Overview

- INTERprofessional Autism Collaborative Training – Project INTERACT
- Prepares graduate student scholars from 3 disciplines (Psychology, Special Education, and Speech-Language Pathology) to address the varied and complex needs of children with autism spectrum disorders (ASD) presenting with moderate to severe intellectual disabilities (ID)
- Training addresses the communication, behavioral, and functional/academic needs of children and is offered through interdisciplinary academic and clinical instruction committed to the core principles of Interprofessional Education (IPE).
- Increases the number and quality of personnel serving children with high-intensity needs.
- US Department of Education Personnel Preparation Grant - Focus Area: (B) Preparing Personnel to Serve School-Age Children with Disabilities who have High-Intensity Needs

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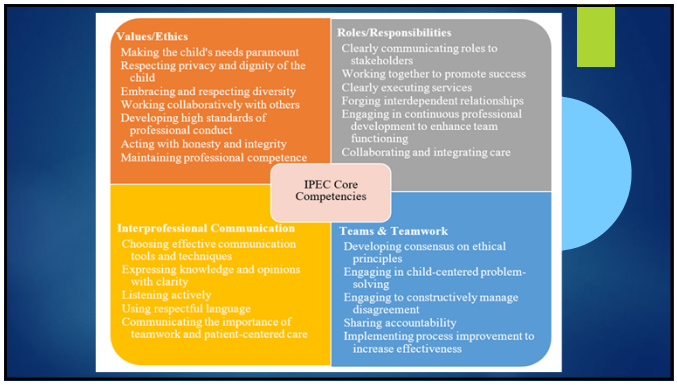
Values/Ethics
Making the child's needs paramount
Respecting privacy and dignity of the child
Embracing and respecting diversity
Working collaboratively with others
Developing high standards of professional conduct
Acting with honesty and integrity
Maintaining professional competence
Roles/Responsibilities
Clearly communicating roles to stakeholders
Working together to promote success
Clearly executing services
Forging interdependent relationships
Engaging in continuous professional development to enhance team functioning
Collaborating and integrating care
IPEC Core Competencies
Interprofessional Communication
Choosing effective communication tools and techniques
Expressing knowledge and opinions with clarity
Listening actively
Using respectful language
Communicating the importance of teamwork and patient-centered care
Teams & Teamwork
Developing consensus on ethical principles
Engaging in child-centered problem-solving
Engaging to constructively manage disagreement
Sharing accountability
Implementing process improvement to increase effectiveness

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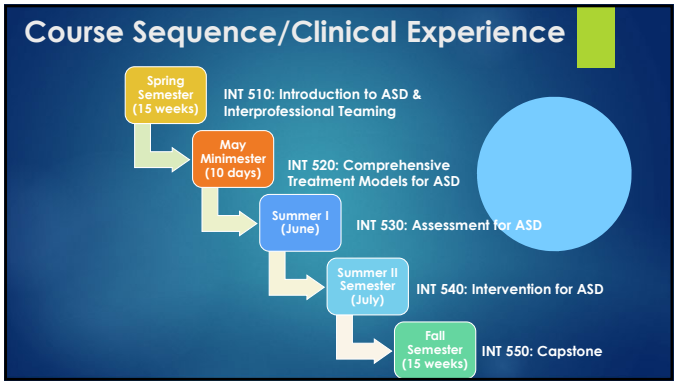
Course Sequence/Clinical Experience
Spring Semester (15 weeks)
INT 510: Introduction to ASD & Interprofessional Teaming
May Minimester (10 days)
INT 520: Comprehensive Treatment Models for ASD
Summer I (June)
INT 530: Assessment for ASD
Summer II Semester (July)
INT 540: Intervention for ASD
Fall Semester (15 weeks)
INT 550: Capstone

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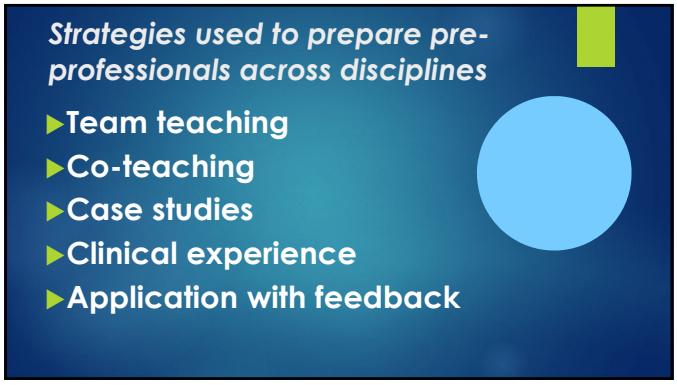
Strategies used to prepare pre-professionals across disciplines
Team teaching
Co-teaching
Case studies
Clinical experience
Application with feedback

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Organization of Interprofessional Teams

Team	CSD	SPED	PSY	Core Faculty	Cyber Faculty [Cherokee School]	Families
Rosebuds				Rose (CSD)		
Cooper Troopers				Cooper-Duffy (SPED)		
We Tried				Price (CSD)		
Camp Moms				Campbell (PSY)		
Collaborative Pack				Ogletree (CSD)		

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Structure of Clinical Experience

- Each IP team was assigned a family of a child/adolescent with ASD & mod-severe ID
  - Supervision provided by team faculty member, plus faculty from other disciplines if needed for scholars' clinical hours
- Each team conducted a series of 5 one-hour family Zoom sessions
  - Sessions 1 & 2 integrated into the Assessment course
  - Sessions 3 & 4 integrated into Intervention course
  - Session 5 integrated into Capstone course

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Sessions 1 & 2: Clinical Assessment (530 - Assessment Course)

- Session 1: Interview
  - Identifying family's concerns and interests
- Session 2: Assessment
  - Examples of assessments administered
    - Direct assessment: Language sample
    - Parent-report: Children's Communication Checklist-2; MacArthur-Bates Communicative Development Inventory; Vineland Adaptive Behavior Scales

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Integration with Assessment Course

- Many assessment procedures discussed in class
- Planning for interviews and assessments, as well as discussing and presenting results, integrated into class
- Completed Interprofessional Assessment Report for class grade

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Case Example: Assessment

- ***Background History and Problem Identification*:** NA is a 5-year-old girl who enjoys cartoons, playing with PlayDoh, pretend play, treasure maps, and being around other people. She received a diagnosis of Autism Spectrum Disorder at two years of age. Communication milestones are significant for production of single word at 15-18 months of age and word combinations at 3 ½ years of age. Parents expressed a desire to obtain information that will assist NA in integrating into school and further increase her personal safety and independence.
- ***Assessment Procedures*:**
  - Informal assessment for recognizing levels of relationships using Boom Cards (from self to stranger)
  - Language Sample
  - Behavior Rating Inventory of Executive Function (BRIEF-2) - Parent Form

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Case Example: Assessment

- Assessment Results and Interpretations for each assessment procedure were provided.
- Recommended Goal/Objectives were developed and discussed with the parents based on assessment results
- Additional Considerations included providing specific examples of self-management strategies for use in the classroom.

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Outcomes

- Scholars across the three disciplines (with a faculty member) used interprofessional collaboration skills to work with the family and child with autism to complete the assessment.
- Scholars shared their expertise across disciplines and the course content to identify the assessment tools needed, strategy on how to administer the assessments, who on the team would administer each assessment, and how the data would be collected.
- Each scholar generated and implemented specific roles and responsibilities on the team.
- Scholars were able to clearly identify the areas of concern for the family and work with the family to generate goals for the student.

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Application and feedback

- Scholars met with their team and faculty member across several sessions to plan their assessment and intervention.
- Scholars also role played how to implement the meeting with the families to prepare and clarify goal for the meeting, their roles and responsibilities as well as their process.
- Discussions occurred regarding the type of communication needed to have a positive and effective session with the family and child with autism and intellectual disability.
- After the session with the family the pre-professional team received feedback (from the family and faculty) on their performance in the session with the family and the student with autism and intellectual disabilities.

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Sessions 3 & 4: Clinical Intervention (540 - Intervention Course)

- Session 3: Assessment Results/Intervention Planning
  - Shared assessment results
  - Discussed directions for intervention; family's priorities, preferences, routines
- Session 4: Intervention Implementation
  - Shared specific intervention objectives and recommended EBPs
  - Explained and demonstrated EBPs; provided materials (such as digital and paper social narratives, visual schedules)
  - Parents tried the EBPs as team observed, coached (as time allowed)

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Integration with Intervention Course

- Many EBPs, procedures for selecting EBPs, strategies for training parents discussed in class
- Planning for the intervention sessions integrated into class
- Completed Interprofessional Intervention Report for class grade

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Session 5: Follow-up (550 - Capstone)

- Session 5: Follow-up
  - Check in with family
    - Progress on objectives? Additional resources, referrals needed?
- Integration with Capstone Course
  - Provides closure with family, as we provide closure for the scholars' overall experience
  - Scholars' needs related to clinical experiences have been targeted in the course
    - Strengths-based language, assessment & intervention scenarios

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Positives outcomes from families

- Family perspectives
  - Positive overall experience
  - Meaningful outcomes for children/families, such as:
    - Progress in potty training
    - Improved child self-regulation
    - Increased child safety
    - Introduction of AAC device
    - Growth in child communication skills
    - Growth in parental knowledge and confidence
    - Parents reported "feeling heard" and supported

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Positives outcomes from Scholars

- Highly valued experience
- Insights into families' experiences, especially at home during COVID
- Telehealth as good preparation for future clinical work
  - Also encouraged team organization and preparation
- Experienced truly family-centered practice
- Teams showed trust, vulnerability, and positive interdependence
- Developed lasting collaborative relationships with each other

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Thank you.

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