Testing the Effects of the PEERS® Intervention for Autistic Youth and Young Adults: Impacts on Mental Health and Neural Activity

January 20, 2021
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Land Acknowledgement

- UBC Vancouver is located on the traditional, ancestral, and unceded territory of the Musqueam people

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Note about Terminology

Person-first language
"Person with autism"

Identity-first language
"Autistic person"

(Bottema-Beutel et al., 2020; Kapp et al., 2013; Kenny et al., 2015)

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Introduction to PEERS®

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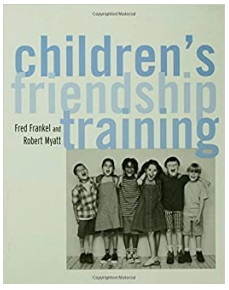
Program for the Education and Enrichment of Relational Skills (*PEERS®*)

- Social skills intervention developed by Elizabeth Laugeson, Psy.D. and Fred Frankel, Ph.D. at the University of California, Los Angeles
- Upward developmental extension of the *Children's Friendship Training* (Frankel & Myatt, 2003)



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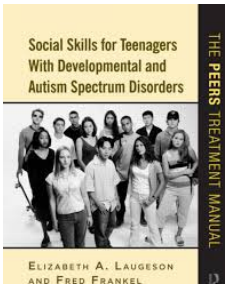
PEERS® Continued

- Parent-assisted intervention
- Adolescents in middle and high school
- Difficulties making and keeping friends
- Developed for and tested with predominantly youth on the autism spectrum
- 14-week program
- Small group format (maximum of 10 teens)
- Concurrent 90-minute teen and parent sessions



Laugeson & Frankel (2010)

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Adolescents: Sessions and Topics

1. Introduction and Conversational Skills I: Trading Information
2. Conversational Skills II: Two-way Conversations
3. Conversational Skills III: Electronic Communication
4. Choosing Appropriate Friends
5. Appropriate Use of Humor
6. Peer Entry I: Entering a Conversation
7. Peer Entry II: Exiting a Conversation
8. Get-togethers
9. Good Sportsmanship
10. Rejection I: Teasing and Embarrassing Feedback
11. Rejection II: Bullying and Bad Reputation
12. Handling Disagreements
13. Rumors and Gossip
14. Graduation and Termination

Laugeson & Frankel (2010)

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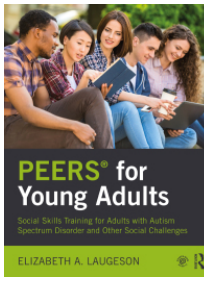
PEERS® for Young Adults

- Upward adaptation of PEERS®
- Caregiver- or social coach-assisted intervention
- Young adults ages 18 to 29
- Difficulties making and keeping friends
- 16-week program
- Small group format
- Concurrent 90-minute young adult and social coach sessions



Laugeson (2017)

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Young Adults: Sessions and Topics

1. Trading Information and Starting Conversations
2. Trading Information and Maintaining Conversations
3. Finding a Source of Friends
4. Electronic Communication
5. Appropriate Use of Humor
6. Entering Group Conversations
7. Exiting Conversations
8. Get-Togethers
9. Dating Etiquette: Letting Someone Know You Like Them*
10. Dating Etiquette: Asking Someone on a Date*
11. Dating Etiquette: Going on Dates*
12. Dating Etiquette: Dating Do's and Don'ts*
13. Handling Disagreements
14. Handling Direct Bullying
15. Handling Indirect Bullying
16. Moving Forward and Graduation

Laugeson (2017)

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Adolescent/Young Adult Session Structure

- Rule Review
- Homework Review
- Didactic Lesson with Role Plays
- Behavioral Rehearsal
- Homework Assignment
- Teen Activity
- Reunification
- Check-outs

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Parent/Social Coach Session Structure

- Homework Review
- Parent/Social Coach Handout
- Homework Assignment
- Reunification

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Study 1: Social Skills and Social Anxiety

PEERS® for Young Adults

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J Autism Dev Disord
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ORIGINAL PAPER

A Replication and Extension of the PEERS® for Young Adults Social Skills Intervention: Examining Effects on Social Skills and Social Anxiety in Young Adults with Autism Spectrum Disorder

Alana J. McVey[1] · Bridget K. Dolan[1] · Kirsten S. Willar[1,2] · Sheryl Pleiss[1,3] · Jeffrey S. Karst[1,4] · Christina L. Casnar[5] · Christina Caiozzo[1] · Elisabeth M. Vogt[1] · Nakia S. Gordon[1] · Amy Vaughan Van Hecke[1]

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Background

- Young adults on the autism spectrum face unique social challenges and fewer social contacts (Gantman et al., 2012)
- Effective social skills are needed across life domains (daily living skills, career, etc.)
- Social anxiety, empathy, and loneliness are common concerns for autistic people (Golan and Baron-Cohen, 2006; Locke et al., 2010; van Steensel et al., 2011)
- Few social skills interventions exist for autistic young adults (Palmen, et al., 2012; Reichow et al., 2013)

(McVey et al., 2016)

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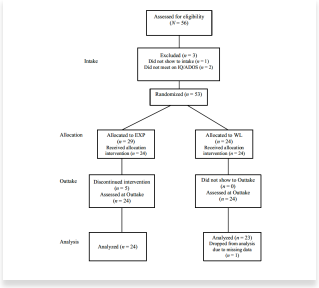
Method: Participants



(McVey et al., 2016)

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Method: Participants

	Group (*N* = 47)		
	Experimental (*n* = 24)	Waitlist control (*n* = 23)	*p*
	M (*SD*)	*M* (*SD*)	
Age (years)	20.92 (1.31)	19.52 (1.70)	ns
Sex (% female)	25.0	13.0	ns
Race (% Caucasian)	83.3	90.9	ns
Ethnicity (% non-Hispanic)	100	91.3	ns
Household income (%)			ns
Under 25 K	4.2	8.7	
25–50 K	4.2	26.1	
50–75 K	29.2	4.3	
75–100 K	16.7	26.1	
Over 100 K	45.8	34.8	
Primary parent education (%)			ns
High school completion	0.0	21.7	
Vocational/technical training	12.5	4.3	
Some college	12.5	21.7	
Bachelor's degree	54.2	39.1	
Master's degree	16.7	4.3	
Doctoral degree	4.2	8.7	
KBIT-2 verbal IQ	93.38 (22.95)	90.81 (21.10)	ns
ADOS-G total score	11.88 (2.83)	11.41 (3.65)	ns

The following variables had different *n* values: Waitlist race (*n* = 22), Waitlist ADOS-G total score (*n* = 22), experimental ethnicity (*n* = 22), and experimental household income (*n* = 23)
KBIT-2, Kaufman Brief Intelligence Test—Second Edition; *ADOS-G* autism diagnostic observation schedule—generic; *p* probability, *ns* not significant

(McVey et al., 2016)

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Method: Measures

Replication

- Autism characteristics (Social Responsiveness Scale; SRS)
- Social skills (Social Skills Improvement System Rating Scales; SSIS)
- PEERS® knowledge (Test of Young Adult Social Skills Knowledge; TYASSK)
- Empathy (Empathy Quotient; EQ)
- Direct social contacts (Quality of Socialization Questionnaire; QSQ)

Extension

- Social Anxiety (Liebowitz Social Anxiety Scale; LSAS)
- Social Phobia (Social Phobia Inventory; SPIN)

(McVey et al., 2016)

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Method
Study Design: Randomized Controlled Trial

(McVey et al., 2016)

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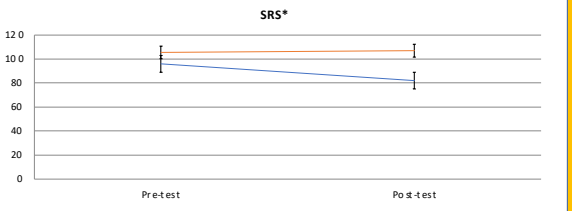
Results: Autism Characteristics



$F(1, 45) = 7.42$, $p = .009$, partial $\eta^2 = .142$

(McVey et al., 2016)

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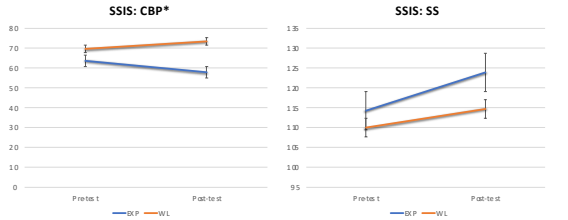
Results: Social Skills



$F(1, 45) = 16.05$, $p = .001$, partial $\eta^2 = .263$

Not significant

(McVey et al., 2016)

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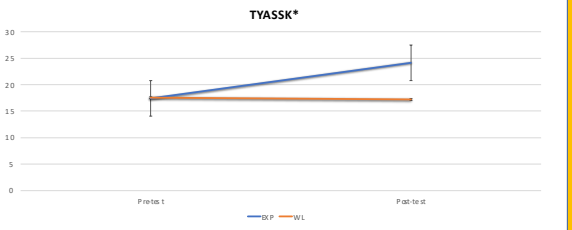
Results: PEERS® Knowledge



$F(1, 45) = 85.60$, $p = .0001$, partial $\eta^2 = .655$

(McVey et al., 2016)

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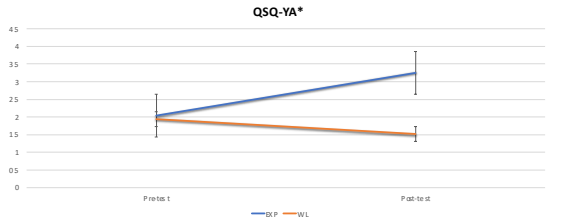
Results: Direct Social Contacts



$F(1, 45) = 4.16$, $p = .047$, partial $\eta^2 = .085$

(McVey et al., 2016)

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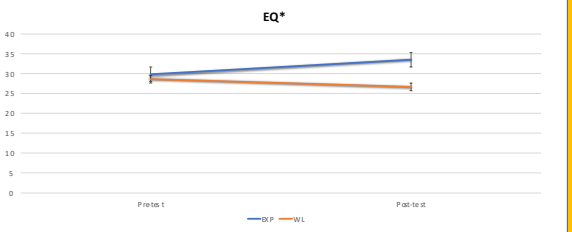
Results: Empathy



$F(1, 45) = 6.74$, $p = .013$, partial $\eta^2 = .130$

(McVey et al., 2016)

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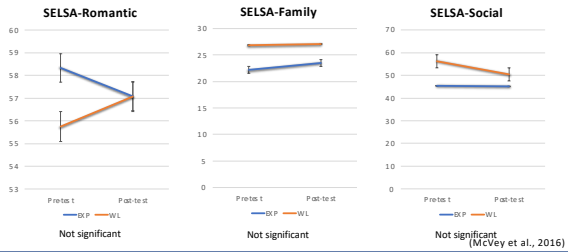
Results: Loneliness



Not significant

Not significant

Not significant

(McVey et al., 2016)

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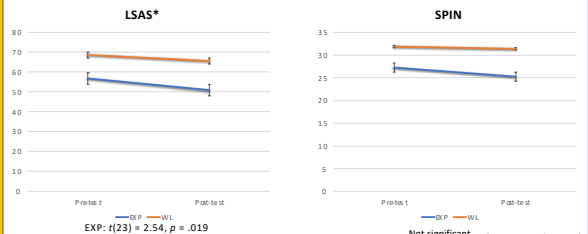
Results: Social Anxiety



EXP: $t(23) = 2.54$, $p = .019$
WL: $t(22) = 1.01$, $p = .324$

Not significant

(McVey et al., 2016)

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Discussion

- First study to replicate results for *PEERS® for Young Adults* outside of the site of development
  - Autism characteristics, social skills, PEERS® knowledge, empathy
- New results demonstrate improvements in social anxiety

(McVey et al., 2016)

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Why improvements in social anxiety?

- Social situations elicit less anxiety (Corbett et al., 2017)
- Level of predictability provided by interventions (Lei et al., 2017)
- Exposure-like processes occur; as social skills are learned and applied, exposure to a previously avoided environment and new learning occurs (McVey et al., 2016)

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Study 2: Improvements in Depression Symptoms and Suicidality

PEERS® for Adolescents

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Journal of Autism and Developmental Disorders
https://doi.org/10.1007/s10803-017-3396-6

ORIGINAL PAPER

Changes in Depressive Symptoms Among Adolescents with ASD Completing the PEERS® Social Skills Intervention

Hillary K. Schiltz[1] · Alana J. McVey[1] · Bridget K. Dolan[1] · Kirsten S. Willar[1] · Sheryl Pleiss[1,2] · Jeffrey S. Karst[1,3] · Audrey M. Carson[1,4] · Christina Caiozzo[1] · Elisabeth M. Vogt[1] · Brianna D. Yund[5] · Amy Vaughan Van Hecke[1]

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Background

- Social difficulties are related to isolation, loneliness, and fewer/less close friendships for those on the autism spectrum (Mazurek and Kanne, 2010; Whitehouse et al., 2009)
- Suicidality is a major concern for autistic youth and adults (Cassidy et al., 2014; Mayes et al., 2013)
  - Even more so since this publication (e.g., Hirvikoski et al., 2019)
- Friendship and social connection in adolescence is critical for psychological well-being (Rubin et al., 2004) and may buffer against deleterious effects of peer victimization (Humphrey & Styles, 2010; Schmidt & Bagwell, 2007)

(Schiltz, McVey et al., 2017)

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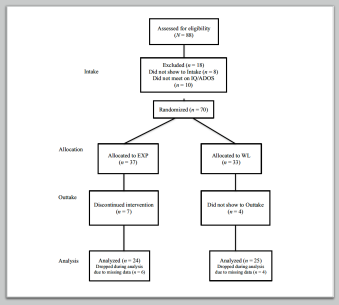
Method: Participants



(Schiltz, McVey et al., 2017)

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Method: Participants

	EXP (n = 24)		WL (n = 25)		*F*/*χ*2	*p*
	M (SD)	Range	M (SD)	Range		
Age	13.25 (1.07)	12–15	13.52 (1.92)	11–16	0.37	0.55
FSIQ	105.33 (12.70)	69–144	104.24 (16.25)	68–133	0.04	0.84
ADOS-G	11.58 (4.22)	7–19	12.60 (4.77)	7–23	0.62	0.43
Gender						
% Female	8.3		8.0		0.002	0.97
Race						
% White	75		76.0		2.34	0.67
% Asian	8.3		4.0			
% Black	8.3		8.0			
% Biracial	4.2		12.0			
Ethnicity						
% Non-Latino	83.3		96.0		2.68	0.26
Household income						
% < 25K	0.0		20.0		7.38	0.19
% 25K–50K	8.3		8.0			
% 50K–75K	25.0		16.0			
% 75K–100K	20.8		20.0			
% > $100K	37.5		36.0			

EXP Experimental group, *WL* waitlist control group, *M* mean, *SD* standard deviation, *FSIQ* Full-Scale Intellectual Quotient as measured by the Kaufman Brief Intelligence Test, Second Edition. *ADOS-G* Autism Diagnostic Observation Schedule, Generic. *K* thousand

(Schiltz, McVey et al., 2017)

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Method: Measures

- Depression (Children's Depression Inventory; CDI)
- Direct social contacts (Quality of Socialization Questionnaire; QSQ)
- Suicidality (CDI)

(Schiltz, McVey et al., 2017)

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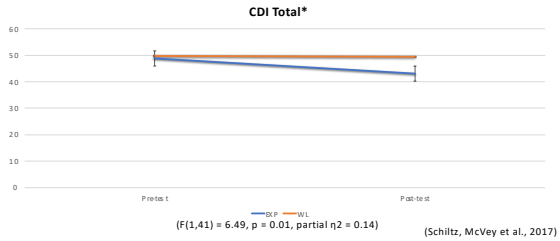
Results: Overall Depression



(F(1,41) = 6.49, p = 0.01, partial η2 = 0.14)

(Schiltz, McVey et al., 2017)

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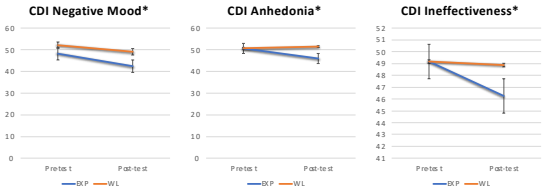
Results: Depression



EXP (t(23) = 3.80, p = 0.001)
WL (t(22) = 1.31, p = 0.33)

EXP (t(22) = 2.59, p = 0.02)
WL (t(23) = − 0.45, p = 0.65)

EXP (t(22) = 2.05, p = 0.052)
WL (t(23) = 0.13, p = 0.90)

(Schiltz, McVey et al., 2017)

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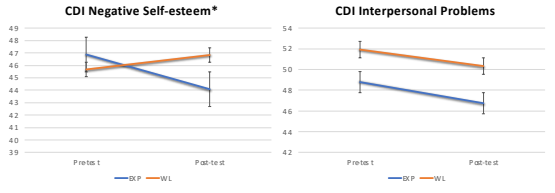
Results: Depression



EXP (t(23) = 1.93, p = 0.06)
WL (t(23) = − 0.94, p = 0.36)

Not significant

(Schiltz, McVey et al., 2017)

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Results: Depression and Social Connection

- Depression (CDI) negatively correlated with parent-reported social contacts (QSQ) at posttest:
  - CDI Total Score ($r(44) = -0.46$, $p < 0.01$)
  - Negative Mood ($r(46) = -0.28$, $p = 0.06$)
  - Interpersonal Problems ($r(47) = -0.32$, $p = 0.03$)
  - Ineffectiveness ($r(46) = -0.38$, $p = 0.01$)
  - Anhedonia ($r(46) = -0.42$, $p < 0.01$)
  - Negative Self-esteem ($r(47) = -0.27$, $p = 0.06$)

(Schiltz, McVey et al., 2017)

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Results: Suicidal Ideation

- Endorsement of suicidal ideation did not exceed the midlevel (i.e., "I think of killing myself but would not do it")
- EXP group
  - 19% ($n = 4$) at pretest
  - 0% at posttest
- WL group
  - 18% ($n = 3$) at pretest
  - *Increased* to 30% ($n = 5$) at posttest

(Schiltz, McVey et al., 2017)

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Discussion

- Evidence for improvements in self-reported depression and suicidal ideation across PEERS®
- Social difficulties are linked with depression for autistic youth
- Worsening of suicidal ideation for the wait list group is concerning, and coordination of care may be necessary for those who cannot enter such a social skills group right away

(Schiltz, McVey et al., 2017)

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Why improvements in depression?

- Social connection is tied to depression (Schiltz, McVey et al., 2017)
- Loneliness has been found to mediate the link between social behavior and both social anxiety and depression in autistic adults (Schiltz, McVey et al., 2020)
- Teaching skills to increase connectedness and decrease loneliness may help alleviate depressive symptoms

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Study 3: Social anxiety and amygdala activity

PEERS® for Adolescents

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Malleability of Neural Activity in Response to Treatment: fMRI Biomarkers Across Intervention for Autistic Adolescents

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Background

- Social skills and social anxiety are highly overlapping for youth on the autism spectrum(Wood & Gadow, 2010)
- Biomarkers may be critical to establishing treatment mechanisms and testing treatment effects in autistic samples (Stavropolous, 2017)
- Social brain:
  - Regions that work independently and together to process social information
  - Amygdala, a brain region responsible for processing social and emotional information, has been implicated in anxiety in the general population and in autism (Brühl et al., 2014; Duval et al., 2015; Herrington et al., 2016, 2017; Mochovitch et al., 2014)
- Aim: To test baseline social anxiety as a predictor of change in amygdala activity after PEERS®

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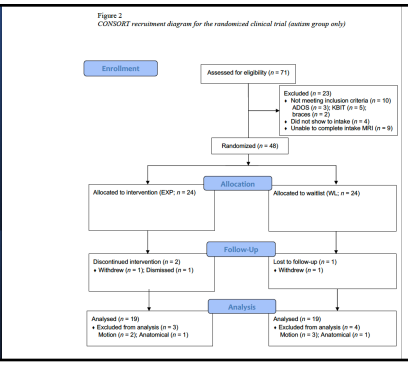
Method: Participants



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Method: Participants

Table 2

Sample Characteristics and Group Comparisons

	Group (*n* = 49)				
	NT (*n* = 11)	EXP (*n* = 19)	WL (*n* = 19)		
	M(*sd*)	*M*(*sd*)	*M*(*sd*)	F/χ^2	*p*
Age	13.91(1.45)	13.08(1.34)	13.58(1.80)	0.16	.855
KBIT-2 IQ Composite	104.45(14.00)	98.89(19.02)	108.79(17.50)	1.54	.226
ADOS-G Total	--	12.84(3.91)	12.68(4.11)	0.12	.904
Gender					--
% Male	100.00	100.00	100.00		
% Female	0.00	0.00	0.00		
Race				5.29	.508
% White	72.70	73.70	84.20		
% Asian	9.10	5.30	0.00		
% Black	0.00	15.80	5.30		
% Biracial/Multiracial	18.20	5.30	10.50		
% Not reported	0.00	0.00	0.00		
Ethnicity				8.66	.013*
% Non-Hispanic/Latinx	63.60	89.50	100.00		
% Hispanic/Latinx	36.40	10.05	0.00		
% Not reported	0.00	0.00	0.00		
Household income				12.74	.238
% Under 25K	0.00	5.30	10.50		
% 25–50K	18.20	0.00	0.00		
% 50–75K	27.30	15.80	15.80		
% 75–100K	9.10	21.10	36.80		
% > 100K	45.50	52.60	31.60		

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Measures

PEERS® measures to ensure the intervention functioned as expected:

- Social Skills Improvement System-Rating Scales (SSIS-RS)
- Social Responsiveness Scale (SRS)
- Test of Adolescent Social Skills Knowledge (TASSK)

Variable of interest:

- Social Anxiety Scale for Adolescents (SAS-A)

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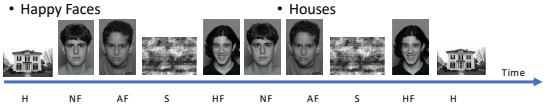
E-Prime One-Back Task Blocks

- Houses
- Neutral Faces
- Angry Faces
- Scrambled
- Happy Faces

- Neutral Faces
- Angry Faces
- Scrambled
- Happy Faces
- Houses



(Egger et al., 2011; Park Aging Mind Laboratory, 2015)

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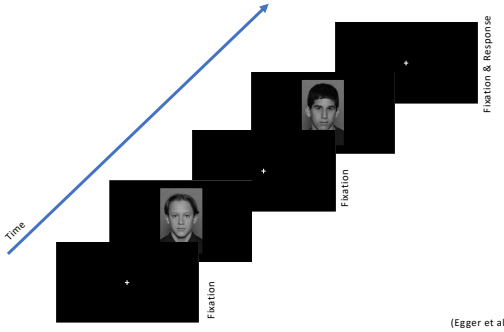

(Egger et al., 2011)

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Results

Symptoms of social anxiety at pretest to predict change in amygdala activity from pretest to posttest for EXP group

- Higher scores on the SAS Parent Fear of Negative Evaluation (FNE) subscale predicted greater decline in right amygdala activity across intervention ($F(1, 17) = 5.00$, $p = 0.040$, $\beta = 0.49$, $R^2 = 0.238$)

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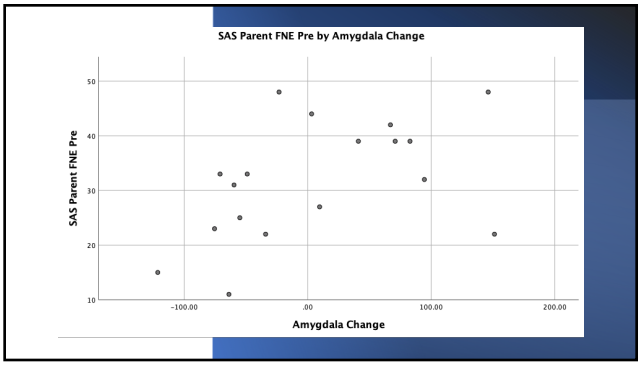

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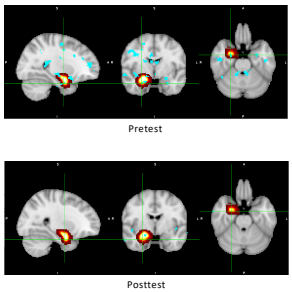
Right Amygdala Activity for the Experimental Group



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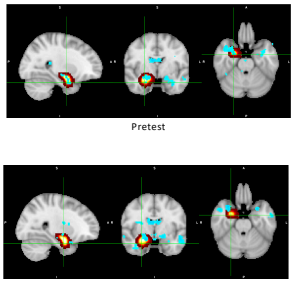
Right Amygdala Activity for the Waitlist Group



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Discussion

- Social anxiety (parent reported fear of negative evaluation) predicted change in amygdala activity across intervention
  - Higher social anxiety prior to intervention showed greater decline in amygdala activity across intervention
- Those with some social anxiety may demonstrate greater social approach and show the most improvements in their behavior and neural activity

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Take-home Conclusions

- Social connection and mental health are linked autistic youth and young adults
- The PEERS® intervention, in teaching evidence-based social skills to youth and young adults on the autism spectrum, promotes mental well-being
- Autistic youth and young adults with some signs of social anxiety and depression may greatly benefit from this intervention
  - More significant mental health concerns may need to be addressed prior to PEERS® (Laugeson & Frankel, 2010; Laugeson, 2017)

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Thank you!

Questions?

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