Teacher, Caregiver, and Child Predictors of Educational Outcomes of Children with Autism

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Introduction

•Public schools have reported a notable increase in the numbers of students with autism served. To help schools provide more efficacious services for students with autism, information is needed on predictors of educational outcomes.

•Although information is available on pre-treatment child predictors (i.e., intelligence, language, social abilities, and autism severity), little information is available on caregiver and teacher predictors of school-based educational outcomes.

•Data on the contributions of possible moderators on child outcomes will inform future intervention research in autism.

Methods

•Thirty-five special education teachers responsible for the IEPs of students with autism between 3 and 8 years were recruited to participate in a randomized controlled study of a COMPASS consultation Ruble, Dalrymple, & McGrew, 2010).

•A teacher consultation theoretical framework was adapted (see Figure 1).

•Prior to group assignment, each teacher, caregiver, and child completed a baseline evaluation at the start of the school year (Time 1; see Table 1).

•The experimental group consisted of 18 teachers. Both groups received a Time 2 evaluation at the end of the school year by an independent evaluator unaware of the group assignment. Observational rating of child goal attainment of select IEP objectives using curriculum based assessment at Time 2 was used to assess outcomes. The Time 1 goal attainment score was used as a covariate in the analyses and the Time 2 goal attainment score was used as the dependent variable.

A correlation analysis between potential predictor variables and child outcome was conducted (see Tables 2 and 3).

Figure 1: Adapted Model of Teacher Consultation (Sparks, 1988)

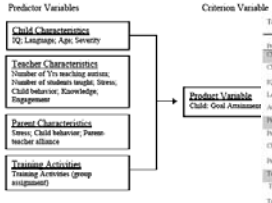

Table 2. *Description of Child, Family, and Teacher Pretreatment Characteristics*

Pretreatment Variables	Description
Child Variables	
Child Change in Goal Attainment	Goal Attainment Scaling (CHAGAS, Cytrynbaum, Ginath, Birdwell, & Brandt, 1979; Ozer, & Ogletree, 2007)
IQ	Differential Abilities Scale (DAS; Elliott, 1990)
Language	Oral and Written Language Scales (OWLS; Carrow-Woolfolk, 1995)
Autism Severity	Childhood Autism Rating Scale (CARS; Schopler, Reichler, DeVellis, & Daly, 1980)
Parent/Caregiver Variables	
Parent Stress	Child Domain of the Parental Stress Index: Third Edition (PSI) (Abidin, 1995)
Child Behavior: Parent and Teacher	Behavioral Symptoms Index of the Behavior Assessment System for Children Second Edition (BASC-2; Reynolds & Kamphaus, 2004)
Parent-Teacher Alliance	Adapted from the Parenting Alliance Inventory (Abidin & Brunner, 1995)
Teacher Variables	
Teacher Stress	Dumpson of the Teaching Process from the Index of Teacher Stress (ITS; Greene, Abidin, & Kmetz, 1997; Greene, Beuterman, Kazmierski, Parli, & Goring, 2002)
Teacher Knowledge	Teacher Knowledge of Autism Questionnaire (Ruble, L. A., Dalrymple, N., McGrew, J., & Jung, L., in press).
Teacher Engagement	Adapted from the Social Interaction Rating Scale (Ruble, L.A., McGuffin, A., King, A., & Lorenz, D., 2008)

Table 1. *Between Group Comparison of Child, Family, and Teacher Characteristics at Time 1*

Characteristics	Control M (SD)	Experimental M (SD)	t test
Child			
Age	6.0 (1.5)	6.2 (1.9)	-.34
Childhood Autism Rating Scale	41.43 (8.2)	36.38 (9.9)	1.55
Differential Abilities Scale Tscore	39.47 (18.4)	53.78 (27.1)	-1.81
Oral and Written Language Scales Sscore	41.13 (19.0)	51.56 (17.2)	-1.67
Vineland Adaptive Behavior Scales Sscore[1]	62.29 (9.2)	64.88 (16.7)	-.56
Behavior Assessment System for Children-2 Tscore[1,2]	59.53 (8.5)	59.83 (7.0)	-.11
Parent / Caregiver			
Parent / Caregiver Income	2.71 (1.0)	3.36 (.9)	-1.77
Teacher			
Teacher Total Number of Children Taught	8.85 (11.5)	4.56 (6.1)	1.29
Teacher Total Years Working with Children with Autism	9.94 (9.9)	5.50 (3.6)	1.74

[1]Based on teacher report, [2]Based on Externalizing Composite
Note. None of the comparisons were statistically significant.

Methods cont.

•Separate hierarchical regression analyses were conducted for each predictor: the first block included only one pretreatment variable (all were centered to adjust for effects of multicollinearity) plus the covariate (Time 1 goal attainment score), the second block added group assignment (COMPASS vs no COMPASS), and the third block added the interaction between group assignment and a pretreatment variable (Tables 4 and 5).

•This analysis was repeated but for each pretreatment variable comparing a model with only group assignment and Time 1 goal attainment score (block 1) to a model that added a pretreatment variable (block 2).

•Because of the multiple tests being conducted and interrelatedness among some pretreatment predictors, all analyses were examined with an adjusted experimentwise error rate ($p < .01$).

Results

•Correlation analyses indicated that no parent, one teacher, and three child variables correlated with child outcome.

•The first analysis tested separately the effects of the predictor, group, and the group by predictor interaction. Teacher engagement was the only significant variable. Specifically, the intervention impact on time 2 GAS scores was greatest for those with lower teacher engagement at time 1. That is, the intervention was most helpful for those who started the intervention trial relatively disengaged.

•A secondary analysis (Table 5) was conducted that used Time 2 engagement levels in an identical regression analysis. The group by engagement interaction was again significant. However, now the intervention was found to be most helpful for those with the highest levels of post-intervention engagement.

•A second hierarchical regression analyses tested separately the effects of group and predictor, after adjusting for baseline levels of GAS (Table 4). Group assignment and the covariate- Time 1 goal attainment, added to the model in the first block, was significant ($p<.02$) for 11 of the 13 variables.

•When the predictor was added in the second block, only autism severity and teacher stress contributed significantly to the model, i.e, explained significant variance in Time 2 GAS scores beyond that explained by group assignment.

Table 3. Partial Correlations Between Child, Caregiver, and Teacher Pretreatment Variables and Child Outcome After Controlling for Baselinje GAS

Pretreatment Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Child Variables														
1. Final GAS Score	--													
2. AGE	0.01	--												
3.IQ	0.41**	-0.22	--											
4. Language	0.45**	-0.22	0.68***	--										
5. Autism Severity	-0.54**	-0.06	-0.57**	-0.63***	--									
Parent/Caregiver Variables														
6. Parent Stress	-0.43*	0.19	-0.53**	-0.30*	0.32	--								
7. Child Behavior: PR	-0.19	-0.14	-0.48**	-0.19	0.16	0.67***	--							
8. Parent-Teacher Alliance	-.03	0.24	-0.02	-0.24	0.14	0.13	-0.17	--						
Teacher Variables														
9. Number of YRS teaching autism	-0.18	0.10	-0.07	-0.11	0.15	-0.10	-0.19	-0.09	--					
10. Number children taught	0.03	0.31	-0.15	-0.27	0.07	0.05	-0.11	0.39	0.77***	--				
11. Teacher Stress	0.45**	0.02	-0.15	-0.15	0.36*	0.10	-0.04	0.17	-0.10	-0.29	--			
12. Child Behavior: TR	-0.42*	0.24	-0.10	-0.14	0.25	0.00	-0.06	-0.04	0.40**	0.20	0.41*	--		
13. Teacher Knowledge	-.03	0.45**	0.01	-0.19	0.22	-0.08	-0.28	0.01	0.34	0.42*	-0.11	0.37*	--	
14. Teacher Engagement	0.29	-0.02	-0.07	0.10	-0.20	-0.28	-0.19	0.11	-0.04	0.18	-0.32	-0.22	-0.18	--

Note. * $p<.05$, ** $p<.01$

Table 4. Heirarchical Analysis of Pretreatment Variables

Pretreatment Variables	Model	Significant F Change	Model	Significant F Change
Child Variables				
AGE	1. Age & PreGAS 2. Group 3. Age x Group	.550 .006 .692	1. Group & PreGAS 2. Age	.011 .987
IQ	1. IQ & PreGAS 2. Group 3. IQ x Group	.017 .028 .037	1. Group & PreGAS 2. IQ	.011 .045
Language	1. Language & PreGAS 2. Group 3. Language x Group	.016 .013 .293	1. Group & PreGAS 2. Language	.008 .029
Autism Severity	1. Severity & PreGAS 2. Group 3. Severity x Group	.005 .016 .237	1. Group & PreGAS 2.Severity	.008 .007
Parent/Caregiver Variables				
Parent Stress	1. Stress & PreGAS 2. Group 3. Stress x Group	.026 .056 .605	1. Group & PreGAS 2. Stress	.016 .101
Child Behavior: PR	1. Behavior & PreGAS 2. Group 3. Behavior x Group	.203 .028 .706	1. Group & PreGAS 2. Behavior	.017 .761
Parent-Teacher Alliance	1. Alliance & PreGAS 2. Group 3. Alliance x Group	.537 .011 .840	1. Group & PreGAS 2. Alliance	.018 .785
Teacher Variables				
Number of YRS teaching autism	1. Years & PreGAS 2. Group 3. Years x Group	.445 .010 .709	1. Group & PreGAS 2. Years	.018 .499
Number children taught	1 Number & PreGAS 2. Group 3. Number x Group	.839 .010 .444	1. Group & PreGAS 2. Number	.026 .745
Teacher Stress	1. Stress & PreGAS 2. Group 3. Stress x Group	.015 .002 .109	1. Group & PreGAS 2. Stress	.011 .002
Child Behavior: TR	1. Behavior & PreGAS 2. Group 3. Behavior x Group	.048 .011 .111	1. Group & PreGAS 2. Behavior	.032 .017
Teacher Knowledge	1. Knowledge & PreGAS 2. Group 3. Knowledge x Group	.541 .006 .927	1. Group & PreGAS 2. Knowledge	.011 .707
Teacher Engagement	1. Engagement & PreGAS 2. Group 3. Engagement x Group	.207 .014 .004	1. Group & PreGAs 2. Engagement	.016 .481

Table 5. Time 2 Heirarchical Analysis of Time 2 Teacher Engagement and Outcome

Time 2 Variable	Model	Significant F Change	Model	Significant F Change
Teacher Engagement	1. Time 2 Engagement & PreGAS 2. Group 3. Time 2 Engagement x Group	.014 .004 .830	1. Group & PreGas 2. Time 2 Engagement	.013 .005

Discussion

•This exploratory study showed that only autism severity exhibited predictive power to explain child outcomes beyond the contribution of the intervention.

•Three explanations for these findings are offered. First, COMPASS intervention is an innovative approach that results in the generation of treatment goals and teaching methods personalized to the strengths and challenges from the child and the environment, thus it may not be expected that the level of functioning of the children before treatment will impact child outcomes. Second, the dependent variable represents an idiographic approach that may be better suited for authentic and child-specific outcome assessment and is perhaps more sensitive in detecting change. Third, the relatively small sample size may underpower the ability to find effects.

•COMPASS intervention is helpful for improving the quality of teacher engagement for low engaged teachers.

•Teacher stress was identified as a new and potentially important pretreatment predictive variable to consider in school based research.

•The findings suggest that COMPASS consultation may provide a novel approach for improving the educational outcomes of children with autism regardless of child pretreatment variables such as IQ, age, and language. Results should be interpreted with caution due to the relatively low sample size.

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