

Brief Report: Outcomes of a Teacher Training Program for Autism Spectrum Disorders

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Abstract In this study a teacher training program for Autism Spectrum Disorders (ASD), based on “structured teaching” (Mesibov et al., *The TEACCH approach to autism spectrum disorders*, 2006) was developed and evaluated within a Pre–Post design. In total, 10 teachers working with 10 students with ASD (mean age 10.0 years) in special education classrooms in Germany were involved in the training. The Pre–Post outcomes measured by teacher questionnaires indicated significant improvement on the Classroom Child Behavioral Symptom Scale as well as on the corresponding Classroom Teachers’ Stress Reaction Scale. In addition, teachers implemented two structured teaching methods on average in their classrooms. These findings provide some first evidence for the clinical and social validity of the training program examined.

Keywords Autism Spectrum Disorder (ASD) · Teacher training · Structured teaching · TEACCH · Outcome study

Because of their specific deficits in social interaction, communication and language, and behavioral flexibility, most children with *Autism Spectrum Disorders* (ASD) need additional support at school (Loveland and Tunali-Kotovsky 2005). People with ASD have limited ability to

adequately receive, process, and respond to social signals which makes it very hard to learn in groups. Since school life consists of various group interactions, children with ASD tend to withdraw from school altogether (Janetzke 1999; Leppert 2002; Leppert and Probst 2005).

Recently, a range of school support programs for children with ASD have been developed in the USA and the UK (Arick et al. 2005; Harris et al. 2005; Olley 2005), a central component of which is trainings for teachers (Mesibov et al. 2006). School-based programs have also been development recently in Germany (Hausotter and Maass 1996) to meet the specific needs for remedial education. However, an analysis of the current research literature reveals that there are scarcely any outcome studies on teacher training programs.

Based on the research reported, this study presents a training program for special education teachers of children with *Autism Spectrum Disorders*, and provides a first-step evaluation. The study focuses on the following research questions: What was the effect of the trainings as reported by teachers in terms of (a) child behavioral symptoms in the classroom, (b) corresponding teachers’ stress reactions, and, (c) implementation of structured teaching strategies into the classroom?

Method

Sample Characteristics of Students and Teachers

The student sample consisted of 10 children (7 males) with autism (diagnosed by DSM-IV criteria, American Psychiatric Association 2000) with a mean age of 10.0 years ($s = 2.1$). According to the Childhood Autism Rating Scale (CARS, Schopler et al. 1980; Steinhausen 1993) six

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of the children had severe autism, three moderate autism and 1 mild autism ($M = 39.0$; $s = 7.0$). Based on school records, nine children have either moderate or severe MR, six used verbal language never or seldom, three used verbal language sometimes, and one used verbal language often.

The trainee sample consisted of 10 teachers (8 female) from two special schools for people who have mental retardation (MR) (with five teachers each) in the Hamburg, Germany area. The average age of teachers was 42.0 years ($s = 13.4$). The teachers each taught one child with autism in their class together with other children with MR but not ASD (mean class size = 8, $s = 1.2$).

The Teacher Training Program

Key Training Goal

The two key goals of the training are (a) the acquisition of knowledge about a theoretically valid disability model of ASD and (b) the acquisition of evidence-based practical methods and skills for the daily teaching and management of children with ASD in the classroom. The selection of these main goals was supported by evidence from international research on school- and family-based interventions in the field of ASD (Marcus et al. 2005; Panerai et al. 1998).

Training Contents

The training included information about the nature, causes, assessment, and treatment of ASD and its implications for the school environment.

It also taught practical methods and educational skills for everyday life in the classroom by focusing on “antecedent interventions” (Bregman et al. 2005) and comprised methods of “structured teaching” (Mesibov et al. 2006) as well as related techniques of “visual supports” (Prizant et al. 2006). The “structured teaching” method contains five main content areas: (1) spatial and (2) temporal structuring of the child’s social and school environment, (3) implementation of a work-learning system, (4) structured design of tasks, and (5) implementation of visual communication aids.

Didactic Method

The didactic methods applied in the trainings included video and slide presentations, exercises in creating structured teaching material (e.g. daily schedules, work systems), and group discussions. Additionally, there was a 40-page printed training manual covering the whole curriculum.

Procedure

The three training sessions took place in schools for students with MR. There were two small groups with five participants in each group. There was an interval of approximately 1 month between each training session (months 1–3). For a period of 6 months after the three group training sessions (months 4–9) the teachers were given individual training sessions in the classroom. Each teacher had $M = 6$ sessions ($s = 1.25$) on average, with a mean duration of $M = 30$ min ($s = 13$) each.

The group trainings were performed by the second author, who had participated in a 5-day intensive TEACCH-training directed by M. E. Bourgondien in 1999. The first author and supervisor of the doctoral dissertation of TL participated in a 5-day intensive TEACCH-training directed by G. B. Mesibov in 1997.

Evaluation Instruments

Classroom Child Behavioral Symptoms Questionnaire (CCBSQ)

This 48-item questionnaire was developed by the authors on the basis of clinical expertise extracted from interviews with special education teachers as well as from own clinical experience with children with ASD. The symptoms were assessed by teachers (see Table 1) on a three point rating scale (1 = “The behavior is shown never or seldom”, 2 = “sometimes”, 3 = “often/very often”) and was completed at both the Pre (at the beginning of the trainings) and Post (9 months later) measurement occasions. An overall symptoms scale score was derived from the sum of all 48 items.

Classroom Teachers’ Stress Reaction Questionnaire (CTSRQ)

This questionnaire contained the same 48 items of the Classroom Child Behavioral Symptoms Questionnaire (see Table 1) with a three point rating scale (1 = “This behavior causes me no/not much stress”, 2 = “some”, 3 = “a lot”) and was also completed at both Pre and Post measurement occasions. An overall stress scale score was derived from the sum of all 48 items.

Implementing Structured Learning Strategies in Everyday School Life Questionnaire

In a semi-structured questionnaire, which included open-ended response sections, the teachers reported on their implementation of one or more of the structured learning.

Table 1 Items of the Classroom Child Behavioral Symptoms Questionnaire (CBBSQ)

The child ...	
01. ... has to be supervised in breaks.	25. ... has difficulty waiting until it is his or her turn
02. ... requires a teacher only for him- or herself during class	26. ... is afraid or anxious
03. ... has to be supervised in class	27. ... shouts in class
04. ... needs help with personal hygiene	28. ... injures him- or herself
05. ... needs help with eating	29. ... attacks other people
06. ... is not able to work independently on his or her individual work tasks	30. ... throws things around
07. ... has little motivation to find out or do something new	31. ... throws tantrums
08. ... is instead fixated in stereotyped patterns or odd behaviors	32. ... breaks his or her own things
09. ... does not finish tasks	33. ... breaks the things of others
10. ... can concentrate on his or her individual task only with difficulty	34. ... shows no imagination in play, e.g. he or she does not give objects other meanings (using a wooden block as a car)
11. ... remains withdrawn in class	35. ... uses play material in strange ways
12. ... often has changes in mood or feelings	36. ... does not respond to verbal and nonverbal cues and appears generally apathetic and indifferent
13. ... reacts in an unpredictable manner	37. ... looks passed or through others as if they were not there
14. ... insists on fixed routines and ritualistic behaviors	38. ... does not play with the other children during breaks
15. ... reacts upset when sudden, unpredictable deviations from daily routines occur	39. ... does not take part in activities involving the whole class (e.g. excursions)
16. ... is fascinated with things that turn, with lights, and shiny things	40. ... shows no pride in showing the teacher the results of his or her work
17. ... tends to provoke others	41. ... is not liked by the other children
18. ... is restless and fidgety in class	42. ... does not show any interest for the world around him or her
19. ... does not do as he or she is told and does not accept rules and respect limits	43. ... does not respond to his or her name
20. ... is tired at school	44. ... does not respond to verbal cues and instructions, e.g., waiting after the instruction "Wait!"
21. ... makes noises in class	45. ... does not respond when directly spoken to about a certain subject (at his/her individual mode and level of communication)
22. ... makes strange body movements in class	46. ... ignores instructions to the class as a whole
23. ... plays with light switches	47. ... does not independently communicate anything regarding a certain subject (at his/her individual mode and level of communication)
24. ... does not recognize danger	48. ... does not clearly and reliably communicate his or her needs (at his/her individual mode and level of communication)

The items related to the following seven topics: (a) method implemented (e.g., daily schedule for structuring time), (b) method aim, (c) duration of implementation, (d) child's reaction to the method, (e) protocol of the implementation, (f) evaluation of the method's success, and (g) sketches of the implementation. On the basis of the completed teacher questionnaire and a 1–2 h direct observation in the classroom, followed by a brief informal discussion with the teacher about various aspects of the implementation process, the trainer assessed the quality of the implementation of each structured learning strategy reported in the teacher questionnaire on a two-point scale (1 = "was implemented appropriately and continually over a period of time of >2 months", 0 = "was not implemented appropriately and continually").

Measurement

At Pre measurement (at the beginning of the training), the teachers completed the Classroom Child Behavioral Symptoms Questionnaire (CCBSQ) and the Classroom Teachers' Stress Reactions Questionnaire (CTSRQ). At the Post measurement occasion (at the end of month 9), teachers once again completed the CCBSQ and the CTSRQ.

Data Analysis

The quantitative data were analyzed using SPSS (Statistical Package for Social Sciences: Version 11). The calculation of the Pre–Post effect sizes with a correction for sample sizes was carried out according to Hedges and Olkin (1985). The Pre–Post effect size represents a standardized

mean difference and is calculated by dividing the difference between the Pre and Post means by the standard deviation of the individual Pre–Post differences.

Results

Evaluation of the Training Outcomes

The Pre and Post outcomes for the overall scores of the Classroom Child Behavioral Symptoms Scale and the Classroom Teachers' Stress Reaction Scale are summarized in Table 2.

Results from the Classroom Child Behavioral Symptoms Scale

According to teachers, the overall behavioral symptoms of the children significantly improved between Pre and Post measurement occasions ($t = 2.37$, $p < .05$). The group mean of the Classroom Child Behavioral Symptom Scale fell from M-Pre = 106.4 ($s = 15.5$) to M-Post = 100.8 ($s = 16.7$). This represents a Pre–Post effect size of $d = 0.66$ which is in the medium range (Cohen 1988). The items of this scale with medium or large Pre–Post effect sizes ($d \geq 0.50$) are shown in Table 3.

Results from the Classroom Teacher Stress Scale

There was also a significant reduction in the overall score of the teachers' stress reactions between Pre and Post measurements: M-Pre = 97.8 ($s = 16.5$), M-Post = 88.3 ($s = 17.3$) ($t = 2.41$, $p < .05$). The Pre–Post effect size of $d = .67$ is in

the medium range. The items of this scale with medium or large Pre–Post effect sizes ($d \geq 0.50$) are shown in Table 4.

Results from the Implementing Structured Learning Strategies in Everyday School Life Questionnaire

Nine of the ten teachers applied at least one structured learning strategy in class. On average the teachers applied $M = 1.8$ strategies ($s = 1.48$) from the five different areas over a continuous time period of >2 months. Spatial and temporal structure strategies were applied the most frequently.

Discussion

In the present study a psychoeducational group training for teachers of children with both ASD and MR was developed and evaluated with a sample of 10 teachers from two schools for children with MR. Because of its high theoretical as well as external validity (Probst 2001), principles and methods derived from the TEACCH-approach found particular consideration in the training program. The evaluation is primarily based on teachers' assessment both of the training process and the outcomes of the trainings.

Evaluation of the Training Outcomes

Behavioral Symptoms of the Children with ASD

According to the teachers there was a clear improvement in the children's behavioral symptoms. The Pre–Post effect size for the whole scale was .66, which is a medium effect size (Cohen 1988). This result is consistent with results for

Table 2 Overview: Pre–Post outcomes for Classroom Child Behavioral Symptom Scale and Classroom Teachers' Stress Reaction Scale (overall scores)

Outcomes	Pre M (s)	Post M (s)	t -test ^a	Pre–Post effect size (d)
Classroom Child Behavioral Symptom Scale	106.4 (15.5)	100.8 (16.7)	$t = 2.37^*$	0.66
Classroom Teachers' Stress Reaction Scale	97.8 (16.5)	88.3 (17.3)	$t = 2.41^*$	0.67

^a t -test for repeated measures; * $p < 0.05$

Table 3 Selected Pre–Post effect sizes for the Classroom Child Behavioral Symptoms Scale ($d \geq 0.50$)

Behavioral Symptoms	Pre–Post effect sizes (d)
06. ... is not able to work independently on his or her individual work tasks	.69
07. ... has little motivation to find out or do something new	.69
11. ... remains withdrawn in class	.92
19. ... does not do as he or she is told and does not accept rules and respect limits	1.28
23. ... plays with light switches	.63
35. ... uses play material in strange ways	.51
36. ... does not respond to verbal and nonverbal cues and appears generally apathetic and indifferent	.52
43. ... does not respond to his or her name	.55

parent training evaluations reported in the English speaking literature (see Probst 2001). An investigation of the Pre–Post effect sizes for individual symptoms (see Table 3) showed that, according to the teachers, there was a reduction in the symptoms that disrupt the class, such as “... does not do as he or she is told and does not accept rules and respect limits” (this had the highest effect size, $d = 1.28$), and “... plays with light switches”, as well as typical symptoms of ASD such as “... does not respond to verbal cues and appears generally apathetic and indifferent”, “... does not respond to his/her name”, and “... shows little motivation”.

The significant reduction of behavioral symptom severity in students with autism as an outcome of a TEACCH-oriented short-term teacher training underlines the theoretical and practical validity of the TEACCH program as well as related approaches with antecedent, visually structured and social communication enhancement components (Bregman et al. 2005; Prizant et al. 2006).

Teacher Stress

The reduction in self-reported teachers’ stress due to child behavioral symptoms had a Pre–Post effect size of $d = .67$, which is also moderately large. Analysis of the items (see Table 4) showed that the perceived reduction in behavioral symptoms that disrupt the class, such as “... does not do as he or she is told and does not accept rules and respect limits” and “... plays with light switches”, also played an important role in reducing teacher stress. In addition, teachers’ stress due to symptoms that demand teachers’ supervision and attention, such as “... requires a teacher only for him- or herself during class”, “requires supervision in class” and “... requires help with personal hygiene/eating” was also be reduced. Behavioral symptoms that disrupt the class were experienced by the teachers as very stressful. The support needed by children with ASD put extreme demands on the personnel structure of schools for children with MR (ratio is two teachers per 8–12 children).

The effects on the children’s behavioral symptoms and the effects on teachers’ stress generally went hand in hand. However, there was a clear discrepancy for the symptom “... does not play with the other children during breaks” (item 38). While teachers’ stress due to this symptom was clearly reduced with a large effect size ($d = 1.03$), the actual behavioral symptom increased slightly ($d = -.28$). According to teachers, this was due to a change in their attitude towards this typical and difficult to change behavioral symptom. Teachers were able to adapt their own wish for more “external” integration by understanding that it is not actually the wish of many children with ASD to play with other children during breaks. The discussion that took place in the trainings about the child’s wish to be alone reduced the pressure on the teachers to integrate the child into the play activities of the other children during breaks and consequently reducing their stress. The change in teachers’ stress due to the behaviors of the child with ASD is an important criterion for assessing the effectiveness of the trainings. Teachers’ stress has a considerable influence on their coping with everyday problems with children with ASD.

Implementing Structured Learning Strategies in Everyday School Life

With regard to the implementation of structured learning methods, the reported increase in competence by teachers was supported by observations and evaluations made in the classroom. On average, the teachers successfully implemented two methods from five areas in the classroom.

However, not all the teachers who implemented at least one structured teaching method in the class reported being able to influence the child’s behavioral problems. These teachers explained that the methods needed time to have an effect, that the methods were not appropriate for the particular child, and/or that a shortage of personnel and time restrictions had lead to increased stress during their implementation.

Table 4 Selected Pre–Post effect sizes for the Teacher Stress Reactions Scale (effect size $d \geq 0.50$)

Classroom Teacher Stress Reactions related to child behavioral symptoms	Pre–Post effect sizes (d)
02. ... requires a teacher only for him- or herself during class	.63
03. ... has to be supervised in class	.51
04. ... requires help with personal hygiene	.56
05. ... requires help with eating	.51
19. ... does not do as he or she is told and does not accept rules and respect limits	.75
23. ... plays with light switches	.55
38. ... does not play with the other children during breaks	1.03
42. ... does not show any interest for the world around him or her	.63

Experimental Validity

In interpreting the results, certain constraints to the experimental validity, both internal and external, must be considered. The internal validity was constrained by the absence of a comparison or control group, possible experimenter effects, as the implementation and evaluation were carried out by the same person. Internal validity was also constrained by the limited range of the outcome measures, which were restricted to teacher self-assessment measures. These restrictions imply that the results of the Pre–Post comparison could be influenced by confounding variables.

The external validity was restricted mainly by the fact that the study was carried out with an unrepresentative sample, which was comprised of mostly highly motivated, self-selected, and voluntary participants.

Conclusion

In general, the results of this first-step evaluation study provide some evidence for the clinical, educational and social validity of the group intervention method examined in the present study. Knowledge about the particular characteristics of children with ASD as well as knowledge about scientifically validated intervention methods should be more strongly integrated into the curricula of teacher training programs in the future than has previously been the case. Further research is necessary to replicate these results in other samples and in order to improve the internal and external validity.

References

- American Psychiatric Association (APA). (2000). *Diagnostic and statistical manual of mental disorders (DSM-IV)* (4th ed.). Washington DC: APA, (DSM-IV-TR).
- Arick, J. R., Krug, D. A., Fullerton, A., Loos, L., & Falco, R. (2005). School-based programs. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., Vol. 2, pp. 1003–1028). Hoboken, NJ: Wiley.
- Bregman, J. D., Zager, D., & Gerdtz, J. (2005). Behavioral interventions. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., Vol. 2, pp. 897–924). Hoboken, NJ: Wiley.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York: Erlbaum.
- Harris, S. L., Handleman, J. S., & Jennet, H. K. (2005). Models of educational intervention. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., Vol. 2, pp. 1043–1054). Hoboken, NJ: Wiley.
- Hausotter, A., & Maass, B. (1996). Schulische Unterstützung von Schülerinnen und Schülern mit autistischem Syndrom in Schleswig-Holstein [Educational support for students with autism spectrum disorders in the German state of Schleswig-Holstein]. *Autismus*, 41, 18–20.
- Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. New York: Academic.
- Janetzke, H. (1999). *Stichwort Autismus [Keyword Autism]* (4th revised ed.). Munich: Heyne.
- Leppert, T., & Probst, P. (2005). Development and evaluation of a psychoeducational group training for teachers of students with autism spectrum disorder and mental retardation. *Zeitschrift für Kinder- und Jugendpsychiatrie & Psychotherapie*, 33, 49–58.
- Leppert, T. (2002). *Entwicklung & Evaluation eines Gruppentrainings für Pädagogen autistischer Schüler [Development and evaluation of a group training for teachers and educators with students with autism]*. Unpublished doctoral dissertation, Psychology Department, University of Hamburg, Germany.
- Loveland, K. A., & Tunali-Kotoski, B. (2005). The school-age child with autistic spectrum disorder. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., Vol. 1, pp. 247–287). Hoboken, NJ: Wiley.
- Marcus, L. M., Kuncze, L. J., & Schopler, E. (2005). Working with families. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., pp. 1055–1086). Hoboken, NJ: Wiley.
- Mesibov, G. B., Shea, V., & Schopler, E. (2006). *The TEACCH approach to autism spectrum disorders*. New York: Springer.
- Olley J. G. (2005). Curriculum & classroom structure. In Volkmar, F. R., Paul, R., Klin, A., & Cohen, D. (Eds.), *Handbook of autism and developmental disorders* (3rd ed., Vol. 2, pp. 863–881). Hoboken, NJ: Wiley.
- Panerai, S., Ferrante, L., Caputo, V., & Impellizzeri, C. (1998). Use of structured teaching for treatment of children with autism and severe or profound mental retardation. *Education and Training in Mental Retardation and Developmental Disabilities*, 33, 367–374.
- Prizant, B. M., Wetherby, A. M., Rubin, E., Laurent, A. C., & Rydell, P. J. (2006). *The SCERTS: A comprehensive educational approach for children with autism spectrum disorders* (Vol. 1, Assessment). Baltimore, MD: Brookes.
- Probst, P. (2001). Parent trainings in the remediation and rehabilitation of children with autism: Concepts and outcomes. *Zeitschrift für Klinische Psychologie, Psychiatrie & Psychotherapie*, 49, 1–32.
- Schopler, E., Reichler, R., DeVellis, R., & Daly, K. (1980). Toward objective classification of childhood autism: Childhood Autism Rating Scale (CARS). *Journal of Autism and Developmental Disorders*, 10, 91–103.
- Steinhausen, H. C. (1993). *Psychische Störungen bei Kindern und Jugendlichen [Mental disorders in children and adolescents]* (2. Auflage). München: Urban & Schwarzenberg.