Effects of Behavior Support Team Composition on the Technical Adequacy and Contextual Fit of Behavior Support Plans

Leah Benazzi, Robert H. Horner, and **Roland H. Good**
University of Oregon

This study examined how the composition of a behavior support team affected use of assessment information in the design of behavior support plans. Specifically, we examined if typical teams designed behavior support plans that differed in (a) technical adequacy and/or (b) contextual fit when (1) teams did not include behavior specialists, (2) teams included behavior specialists, or (3) behavior specialists worked alone. Fifty-eight school personnel on 12 behavior support teams from typical elementary schools and 6 behavior specialists participated in the study. Vignettes describing hypothetical students with functional behavior assessment outcome information were used to develop 36 behavior support plans (12 by teams alone, 12 by specialists alone, and 12 by teams with specialists). Results were assessed by 3 expert behavior analysts for technical adequacy and by all 64 team members for contextual fit. Technical adequacy tended to be rated high if specialists alone or teams including a specialist designed the plan. Contextual fit tended to be rated high when teams alone or teams including a specialist designed the plan. Team members ranked plans developed by the team alone and plans developed by the team with a specialist as preferred for implementation over plans developed by a specialist alone. Implications for the selection of behavior support team membership are discussed.

Throughout the United States, teams of school personnel assemble regularly to develop individualized behavior support plans for students who perform chronic problem behavior. The goals embedded in these plans typically focus on redesigning a student's environment to (a) reduce problem behavior, (b) improve social and academic performance, and (c) reduce the behavioral barriers that hinder educational opportunities for peers. Recent research suggests that successful development of socially appropriate behavior is most likely if problem behavior is identified early and appropriate interventions are implemented (Walker, Colvin, & Ramsey, 1995; Walker & Shinn, 2002). The effects of interventions for problem behavior are enhanced when the elements of an intervention are based on the hypothesized function of the student's problem behavior (Bergstrom, Horner, & Crone, 2004; Carr et al., 1999; Didden, Duker, & Korzilius, 1997; Filter, 2003; Ingram, Lewis-Palmer, & Sugai, 2005; Miltenberger, 1990; Newcomer & Lewis, 2004). This function-based support is a critical element of a larger schoolwide approach to positive behavior support (Crone & Horner, 2003; Horner, 2000; Horner, Sugai, Todd & Lewis-Palmer, 2005; Sugai & Horner, 2002; Walker et al., 1996). The 1997 amendments to the Individuals with Disabilities Education Act (IDEA) made functional behavioral assessment (FBA) and positive behavior support legal requirements for schools serving students with disabilities (Prasse, 2002; Yell & Shriner, 1997). The 2004 reauthorization of IDEA retains this emphasis on supporting students using FBA-guided positive behavior support (20 U.S.C. § 1400 *et seq*.).

At this time, however, there is debate about the standards for how to implement function-based behavior support most effectively and how to monitor its effects (Nelson, Roberts, Mathur, & Rutherford, 1998). Fiscal cuts and increased expectations make the inefficient and ineffective allocation of resources unacceptable. In a study assessing the use of FBA information in the design of behavior support, Hsiao and Albin (2000) found that access to FBA information did not affect the behavioral support recommendations of behavior support teams. In a follow-up study with similar results, Mitachi and Albin (2001) suggest that at least one member of a behavior support team needs formal training in behavioral theory if school personnel are to use FBA information effectively. Mitachi and Albin recommend that future research assess the critical features that predict when FBA information is and is not used to guide the design of behavior support plans.

Benazzi, Nakayama, Sterling, Kidd, & Albin (2003) assessed the ability of 68 school personnel with self-reported training in behavioral theory to apply FBA information to the

Address: Leah Benazzi, leah-benazzi@beavton.k12.or.us.

selection of interventions for a student's behavior support plan. The authors found that individuals with training in behavioral theory used FBA information to guide their design of behavior support plans. Study participants were not only more likely to select intervention strategies that were consistent with the FBA hypotheses, they were also more likely to reject intervention strategies that were contraindicated by FBA hypotheses.

Nelson et al. (1998), Hsiao and Albin (2000), Mitachi and Albin (2001), and Benazzi et al. (2003) emphasize the need to define the features of behavior support planning that will result in plans that are both implemented with fidelity and likely to change student behavior. Current literature suggests that the use of FBA information is important for selecting effective behavior support elements. Similarly, current literature recommends that the members of a behavior support team include individuals who are knowledgeable about the student, the local context, and formal behavioral theory.

A behavior support plan is a detailed description of how a student's environment should be redesigned to promote appropriate behaviors and to decrease or extinguish inappropriate behaviors (Sugai, Horner, & Gresham, 2002). Interventions are specific procedures for redesigning the environment and should be selected based on functional assessment information about (a) the antecedent events that occasion the problem behavior, (b) operational descriptions of the problem behavior(s), and (c) the specific consequences that maintain the problem behavior(s) (O'Neill et al., 1997). Antecedent manipulations strive to alter access to the events that function as establishing operations and discriminative stimuli for problem behavior. New teaching objectives focus on building appropriate behaviors that serve the same function as the problem behaviors. Consequences are redesigned both to minimize reinforcement of problem behavior and to increase reinforcement of desired alternative behaviors. In this way, FBA information functions as the cornerstone of a technically strong behavior support plan (Carr, Langdon, & Yarbrough, 1999; Horner, Albin, Sprague, & Todd, 2000; O'Neill et al., 1997; Sugai, Horner, & Sprague, 1999).

The success of a behavior support plan, however, may involve more than technical adequacy. For a plan to work, it must be implemented with adequate fidelity. The likelihood that a plan is implemented may be affected by the "contextual fit" of plan procedures (i.e., the consistency of plan procedures with the values, skills, resources, and administrative support of those who must implement the plan; Albin, Lucyshyn, Horner, & Flannery, 1996; Sandler, Albin, Horner, & Yovanoff, 2002). In their review of school-based interventions, Elliot, Witt, Kratochwill, & Callan-Stoiber (2002) highlight the impact of contextual fit on effectiveness and fidelity of behavior support.

Current research elucidates the importance of developing behavior support that is both research-based in its adherence to behavioral theory and suitable for implementation in typical applied settings. To build behavior support plans that are both technically sound and have strong contextual fit, the members of a behavior support team will likely need to combine at least three forms of knowledge (a) knowledge about the student and his or her behavior, (b) knowledge about the context in which support will be provided, and (c) knowledge about behavioral theory. No single member is likely to have all three forms of knowledge, but the team should be assembled with the vision of ensuring that, as a group, they have the foundations needed to use functional assessment information to design an effective and doable strategy for support.

This study assessed how the experience and knowledge of team members affects the content of behavior support plans developed from simulated problem behavior vignettes. The study compared the technical adequacy and contextual fit of FBA-guided behavior support plans developed by (a) behavior specialists with knowledge about behavioral theory and the student but not the setting, (b) behavior support teams that included individuals with knowledge about the student and the setting but no knowledge of behavioral theory, and (c) teams that included individuals with knowledge about the student, the setting, and behavioral theory.

Method

Setting

Twelve teams from 11 elementary schools in the Pacific Northwest participated in the study. Nine of the 11 schools are located in a mid-size city, 1 is located in a small town, and 1 is located in a rural setting. Each team was based in a school serving an average of 333 students. The largest school served 524 students, and the smallest served 186 students. Caucasian students represented between 62 and 92% of each school's student body. The average student-to-teacher ratio for participating schools was 21.67 to 1. Schools were selected from three school districts that were implementing schoolwide positive behavior support (SW-PBS; Lewis & Sugai, 1999) based on (a) self-nomination and (b) presence of existing behavior support teams. None of the schools was receiving formal training in FBA or individual behavior support plan design at the time of the study.

Participants

School-Based Teams. A total of 58 individuals in 12 preexisting school-based teams, ranging in size from 3 to 8 members, were recruited for participation in this study. One of the 11 participating schools utilized two teams (no overlapping members) in the development of behavior support for students. Each participating team represented one component of a larger effort to implement SW-PBS, and each team included at least three members of the school staff who met regularly to develop behavior support for students. Teams often included both general education teachers and special education teachers. Some teams also included administrators and school psychologists.

Team members ranged in experience from individuals new to the district to individuals who had over 15 years experience with the district. Each team member completed a self-assessment to rate his or her training in and knowledge of behavioral theory on a scale from 1 (*not knowledgeable*) to 10 (*very knowledgeable*). Team member formal training in behavioral theory varied. However, all team members had received at least one personnel preparation course in classroom management procedures, and none of the team members had received formal course instruction on FBA (although some had attended in-service workshops). Team member self-reports of knowledge of FBA and behavioral theory are presented in Table 1. Although all participating teams had an average team rating below the *very knowledgeable* score range of 8–10, 8 of 12 teams included at least 1 team member who rated him- or herself as *very knowledgeable*. None of the members of the school-based teams had received formal training in the application of behavioral theory to guide the design of behavior support plans from FBA results, and none of the team members were Board Certified Behavior Analysts (BCBA).

Behavior Specialists. Six behavior specialists participated in the study. The behavior specialists had each completed or were near completing doctoral training in applied behavior analysis at the University of Oregon. None of the specialists were employed by the University of Oregon. As part of the selection criterion, each specialist needed to submit two FBAs and behavior support plans that he or she had developed. These behavior support plans were evaluated by the first author using scoring criteria from the *Intensive Individualized Interventions Critical Features Checklist* (Lewis-Palmer, Todd, Horner, Sugai, & Sampson, 2004; see Dependent Variables section). Each behavior specialist was required to obtain a score of 85% or better on two behavior support plans. All 6 behavior specialists obtained scores of 100% on both behavior support plans.

TABLE 1. Self-Reported Knowledge of Functional Behavioral Assessment and Behavioral Theory by Team Members

Team	Team member ratings	*M*
A	1, 7, 1.5, 5	3.6
B	8.5, 7, 5, 4, 6	6.1
C	7, 8, 3, 6, 3	5.4
D	3, 2, 7, 5	4.3
E	3, 4, 8, 5, 5, 2, 6.5, 1	4.1
F	2, 2, 1, 5, 3, 8	3.8
G	8, 4, 5, 4, 5, 5	5.2
H	8, 5, 3	5.3
I	3, 6.5, 1, 1, 5.5, 6, 8	4.4
J	7, 8, 8	7.7
K	1, 6, 4, 6	4.3
L	3, 6, 6	5

Each behavior specialist worked with two school-based teams. The behavior specialists were provided with training in creating behavior support plans. They were also provided with a sample script (following guidelines provided by Crone & Horner, 2003) to guide their work with school-based teams. The behavior specialists were encouraged to follow the steps outlined in the script and to use Crone and Horner's competing behavior pathway model when working with teams. Each behavior specialist was observed by the first author when working with the school-based teams to ensure that his or her approach followed the steps of the competing behavior pathway model. None of the behavior specialists were BCBA certified.

Expert Panel. Behavior support plans developed for the study were examined by a panel of three expert behavior analysts. Members of the expert panel were individuals with professional expertise in function-based support as evidenced by at least 5 years of professional research in the area and three or more peer-reviewed publications on FBA and its use in creating behavior support plans. The three expert panelists participating in this study represented three major research institutions. The expert panelists were informed that the study was focused on variables affecting the technical adequacy of behavior support plans, but they were blind to the specific research questions under consideration and the conditions of the study.

Procedure

Four vignettes of children with problem behavior were used to guide development of behavior support plans. Each vignette provided a demographic description of a student, operational information about the problem behaviors performed by the student, and FBA information documenting (a) conditions in which the problem behavior was most and least likely, (b) a description of the full set of problem behaviors observed, and (c) the reinforcer maintaining the problem behavior. These vignettes were distributed across the 12 behavior support teams and the 6 specialists to build a total of 36 behavior support plans. Twelve behavior support plans were developed by behavior specialists on their own, 12 were created by school-based teams working alone, and 12 were created by teams working with a behavior specialist. Table 2 provides a summary of the distribution of vignettes across teams and specialists. This process resulted in 3 behavior support plans for each team: (a) 1 plan developed by the team alone, (b) 1 plan developed by the team with a specialist, and (c) 1 plan developed by a specialist alone (a total of 36 behavior support plans).

Each of the 36 behavior support plans was assessed for technical adequacy by the three expert behavior analysts. Each member of a team evaluated the contextual fit of the three plans associated with their team, and as a final task, each team member ranked the three plans reviewed by their team to iden-

TABLE 2. Study Design

	Team											
Plan	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**
1	Behavior Specialist 1 *(Isabel)*	Behavior Specialist 1 *(Marianne)*	Behavior Specialist 2 *(Luis)*	Behavior Specialist 2 *(Isabel)*	Behavior Specialist 3 *(Marianne)*	Behavior Specialist 3 *(Luis)*	Behavior Specialist 4 *(Luis)*	Behavior Specialist 4 *(Marianne)*	Behavior Specialist 5 *(Isabel)*	Behavior Specialist 5 *(Luis)*	Behavior Specialist 6 *(Marianne)*	Behavior Specialist 6 *(Isabel)*
2	Team + Behavior Specialist 1 *(Luis)*	Team *(Isabel)*	Team + Behavior Specialist 2 *(Charles)*	Team *(Luis)*	Team + Behavior Specialist 3 *(Isabel)*	Team *(Marianne)*	Team *(Marianne)*	Team + Behavior Specialist 4 *(Isabel)*	Team *(Luis)*	Team + Behavior Specialist 5 *(Charles)*	Team *(Isabel)*	Team + Behavior Specialist 6 *(Luis)*
3	Team *(Marianne)*	Team + Behavior Specialist 1 *(Charles)*	Team *(Isabel)*	Team + Behavior Specialist 2 *(Marianne)*	Team *(Luis)*	Team + Behavior Specialist 3 *(Charles)*	Team + Behavior Specialist 4 *(Charles)*	Team *(Luis)*	Team + Behavior Specialist 5 *(Marianne)*	Team *(Isabel)*	Team + Behavior Specialist 6 *(Charles)*	Team *(Marianne)*

Note. Names in parentheses indicate student vignette used for plan development.

tify preference for implementation. Specific procedures for vignette design and plan development are defined below.

Vignettes. Four written vignettes depicting student problem behavior were provided to the behavior specialists and the school-based teams. Table 3 provides a summary of the name, grade, problem behavior(s), antecedent context, and maintaining reinforcer defined in each vignette (vignettes may be obtained from the first author). The information included in each vignette was selected to reflect a behavioral challenge typically faced by a school-based team. Each one-page vignette included information about the hypothetical student's background, a description of the student's problem behavior, and the summary from an FBA for the student. A photograph of the hypothetical student described in the vignette was also provided in an attempt to make the vignette more realistic.

Behavior Support Plans. A behavior support plan was any document that defined how the student's environment should be altered to decrease problem behavior and enhance desired behavior. All teams and specialists had access to the three-part behavior support plan template recommended by Crone and Horner (2003). This template follows the competing behavior pathway model and prompts plan developers to (a) diagram the functional assessment hypothesis statement; (b) identify a list of intervention options for modifying antecedent events, teach replacement skills, and alter consequences; and (c) select the best constellation of options that are likely to meet both the conceptual standards of technical adequacy and the practical standards of contextual fit. The template also prompts identification of specific steps to implement the support procedures, collect data on fidelity and impact, and organize safety procedures for dangerous behavior.

Teams working alone, teams working with a behavior specialist, and behavior specialists working alone all had access to Crone and Horner's (2003) behavior support plan template and were given 75 min to review a vignette and then build a plan of support. Teams were allowed to use other behavior support plan formats if they so chose. All plans developed by the behavior specialist working alone or by teams working with a behavior specialist used the Crone and Horner template. Of the teams working without a specialist, 1 team used the Crone and Horner template, and the other 11 teams used either their district forms or a blank sheet of paper to build their plans.

Measurement of Dependent Variables

Technical Adequacy. Three expert behavior analysts used the scoring guide based on the *Intensive Individualized Interventions Critical Features Checklist* (Lewis-Palmer et al., 2004) to evaluate the behavior support plans for technical adequacy. These panelists scored the 12 behavior support plans on a scale ranging from 0 to 17, indicating how many of 17 essential elements the plan included. These elements included the following: an operational description of the problem behavior, the FBA summary statement, strategies for preventing the problem behavior, instructional strategies for teaching an alternative behavior, strategies for minimizing the reinforcement of problem behavior and for maximizing reinforcement for appropriate behavior, and a system for assessing the fidelity of implementation of the plan and the plan's effect on student behavior. The checklist also asked the expert scorer to indicate whether each of the interventions generated by the team was indicated by the FBA results provided in the vignette. Scores were averaged across panel members so that each behavior support plan was awarded one score for technical adequacy.

We assessed the interrater agreement of the three behavior experts by computing three agreement scores for each behavior support plan (Expert A to Expert B; Expert B to Expert C; Expert A to Expert C). We computed agreement by di-

TABLE 3. Summary of Vignette Information

Name	Grade	Problem behavior(s)	Antecedent context	Maintaining reinforcer
Charles	4	Yell Tear up work Throw material	Seatwork	Obtain teacher attention
Isabel	5	Grab work of others Rock Cry	Reading period	Avoid reading tasks
Luis	3	Be physically aggressive (push, kick) Grab possessions of others	Unstructured class or playground periods Peer teasing	Avoid peer teasing
Marianne	6	Name-call Use sexually inappropriate language Pass notes	Instructional class periods	Obtain peer attention

viding the smaller score by the larger and multiplying by 100%. We then computed the average agreement for each behavior support plan from the three agreement scores. Agreement across the 36 plans averaged 87%, with all but 1 plan scoring above 70%.

Contextual Fit. The behavior support plans created under each of the three plan developer conditions (i.e., team working alone, team working with a behavior specialist, and behavior specialist working alone) were evaluated by the team members to assess the extent to which the strategies and interventions included in each plan reflected the skills, values, knowledge, and resources of the team members and their schools. Team members rated each of the three plans using a 16-item contextual fit questionnaire (Salantine & Horner, 2002). Each item was rated on a 6-point Likert-like scale, ranging from *strongly disagree* to *strongly agree,* making the highest possible contextual fit score for a behavior support plan 96. The 16 items on the questionnaire were organized into eight domains (2 questions per domain): knowledge of the elements of the plan, skills needed to implement the plan, values reflected in the plan, resources available to implement the plan, administrative support, effectiveness of the plan, whether the behavior support plan is in the best interest of the student, and whether the behavior support plan would be efficient to implement. The Contextual Fit Rating Scale was based on factor analysis results provided by Sandler et al. (2002) and from content validity results reported by Salantine & Horner (2002), documenting statistically significant covariation between contextual fit scores from the Contextual Fit Rating Scale and the likelihood that typical behavior support team members would select an intervention for implementation.

Preference Rankings. At the conclusion of the study, team members were asked to rank-order the three behavior support plans developed by their team (one by the team working alone, one by the team working with a behavior specialist, and one by a behavior specialist working alone) according to their preference for implementation. A copy of each of the three plans was provided and each team member was asked, "Which of these three plans would you most prefer to implement at this school if given a choice? Which would be your second choice?"

Results

We analyzed the data using a one-way repeated measures analysis of variance (ANOVA). We conducted orthogonal planned comparisons (based on Keppel & Zedeck, 1989) involving all three plan developers (teams working alone, teams working with a behavior specialist, behavior specialists working alone) to test the theories that (a) teams working alone develop plans with lowest technical adequacy, whereas increases in technical adequacy do not differ between plans developed by behavior specialists working alone and plans developed by teams working with a behavior specialist; (b) behavior specialists working alone develop plans with lowest contextual fit, whereas increases in contextual fit do not differ between teams working alone and teams working with a behavior specialist; and (c) implementers rank plans produced by behavior specialists working alone lowest, whereas rankings do not differ between plans developed by teams working alone and plans developed by teams working with a behavior specialist.

Primary Research Questions

Technical Adequacy of Plans by Plan Developer. The mean technical adequacy score for teams working alone averaged 8.57 (SD = 3.36), for teams working with a behavior specialist averaged 13.95 (SD = .71), and for behavior specialists working alone averaged 15 (SD = 1.02).

The effect of plan developer (team working alone, team working with a behavior specialist, or behavior specialist working alone) was significant, $F(2, 22) = 32.89, p < .01$. Only the planned Behavior Specialist Involvement was significant, revealing that technical adequacy scores for plans developed by teams working alone were significantly lower than for plans developed by a behavior specialist working alone or by a team working with a behavior specialist, $F(1, 22) = 64.26, p < .01$. Technical adequacy did not differ significantly between plans developed by behavior specialists working alone and by teams working with a behavior specialist, $F(1, 22) = 1.52$, *ns*.

To better understand the sources of these effects, we conducted a post-hoc analysis. While the analysis of the primary research questions represents a statistically powerful, theory-driven examination, a post-hoc consideration of technical adequacy scores by item is exploratory. A detailed analysis of each of the 17 items by plan developer significantly increases the possibility of Type 1 error (the flawed assumption that an effect is significant when it is not). To address this concern, we considered findings significant only if they met the required significance level of the most conservative Bonferroni procedure.

The Bonferroni procedure used was based on a familywise alpha of .05. This Bonferroni family-wise alpha, or Type 1 error rate, was applied to all of the 17 items of the technical adequacy measure. By specifying one "family" of 25 items (the sum of 17 technical adequacy items and eight contextual fit domains), the Bonferroni procedure produces the most conservative estimate of actual significant findings.

The consideration of these 25 items or comparisons results in an alpha per comparison of $.05 / 25 = .002$. That is, differences in individual technical adequacy (and contextual fit) items by plan developer were considered significant only if the p value for that item was $\leq .002$. Due to the conservative nature of this procedure, there may be more actual differences by plan developer than those we report.

Table 4 provides a summary of technical adequacy scores for each item included in the Critical Features Scoring Guide

TABLE 4. Repeated Measures Analysis of Variance Summary of the Effects of Plan Developer on Technical Adequacy Scores by Item

Critical element	*F*	Behavior specialist	Team	Team + behavior specialist
Problem behavior defined	3.38	0.95	0.68	0.78
Problem behavior consistent with FBA	2.73	0.95	0.59	0.64
Antecedent strategies identified	4.40	1.00	0.83	1.00
Antecedent strategies consistent with FBA	2.13	0.98	0.83	0.95
Function identified	14.14*	1.00	0.70	1.00
Function consistent with FBA	33.65*	0.98	0.48	0.93
Preventative strategies identified	16.20*	0.98	0.58	0.98
Preventative strategies consistent with FBA	15.14*	0.95	0.56	0.90
Teaching strategies identified	5.51	0.92	0.68	0.92
Teaching strategies consistent with FBA	7.99	0.93	0.55	0.81
Strategies to minimize rewards identified	55.30*	0.93	0.28	0.84
Strategies to minimize rewards consistent with FBA	28.97*	0.87	0.19	0.67
Positive reinforcement strategies identified	5.57	0.94	0.78	0.98
Positive reinforcement strategies consistent with FBA	10.95	0.89	0.63	0.95
Person responsible for each identified	134.16*	0.93	0.11	0.83
Method for assessing fidelity identified	1.50	0.03	0.00	0.05
Method for assessing impact identified	163.83*	0.93	0.13	0.84

Note. FBA = functional–based assessment.
*p < Bonferroni family-wise alpha of .05.

(based on Lewis-Palmer et al., 2004), by plan developer. The technical adequacy scores for the plans developed by teams working alone were statistically different from scores for plans developed by teams working with a specialist and from scores for plans developed by the specialist alone in (a) the likelihood that the plan defined the maintaining function for the problem behavior, (b) the likelihood that the plan included a prevention strategy, (c) the likelihood that the plan included a strategy for placing the problem behavior on extinction, (d) the likelihood that the plan specified one or more persons responsible for implementation, and (e) the likelihood that the plan included a strategy for monitoring the impact on student behavior.

Contextual Fit of Plans by Plan Developer. Mean contextual fit scores by plan developer document that teams working alone averaged 86.41 (SD = 6.38), behavior specialists working alone averaged 76.27 (SD = 9.25), and teams working with a specialist averaged 86.68 (SD = 6.52). The effect of plan developer (team working alone, team working with a behavior specialist, or behavior specialist working alone) was significant, $F(2, 22) = 15.50$, $p < .01$. Planned comparisons for Team Involvement revealed that contextual fit scores for plans developed by a behavior specialist working alone were significantly lower than scores for plans developed by a team working alone or scores for plans developed by a team working with a behavior specialist, $F(1, 22) = 30.99$, $p < .01$. Contextual fit did not differ significantly between plans developed by teams alone and plans developed by teams working with a behavior specialist, $F(1, 22) = .02$, *ns*.

Using the same procedures described for technical adequacy, we conducted a post hoc analysis to examine differences in contextual fit domains. These domains were considered to vary significantly by plan developer if differences were significant at the $p \leq .002$ level. Table 5 summarizes results indicating that when team members evaluated the behavior plans from the three developers (teams working alone, teams working with a behavior specialist, and behavior specialists working alone), they found (a) that team members were less knowledgeable about the procedures recommended by behavior specialists working alone than about procedures recommended by the other two plan developer groups; (b) that team members rated more values conflicts with procedures recommended by behavior specialists working alone; and (c) that team members rated the plans developed by behavior specialists working alone to be less likely to be effective, less likely to be in the best interest of the student, and less efficient to implement.

Preference Ranking of Plans by Plan Developer. We determined preference rankings using a nominal scale in which

TABLE 5. Repeated Measures Analysis of Variance Summary of the Effects of Plan Developer on Contextual Fit Scores by Domain

Contextual fit domain	*F*	Behavior specialist	Team	Team + behavior specialist
Knowledge	15.99*	5.08	5.76	5.67
Skills	9.72	5.35	5.62	5.56
Values	54.62*	4.69	5.85	5.76
Resources	2.59	4.62	4.89	4.90
Administrative support	10.68	4.93	5.23	5.32
Effectiveness	29.78*	4.29	5.25	5.40
Best interest	30.21*	4.78	5.74	5.77
Efficiency	13.10*	4.32	5.04	4.97

*p < Bonferroni family-wise alpha of .05.

team members ranked the three plans by order of preference. The plan in the first position was to be the team member's preferred plan, the plan in the second position was to be the team member's second choice, and the plan in the third position was to be the team member's third choice. With this ranking system, a lower score is desirable as it indicates a plan with a higher preference ranking. The mean preference rankings for plans created by teams working with a behavior specialist or by teams working alone were 1.73 (SD = .59) and 1.63 (SD = .53), respectively. These means did not differ from each other, but both differed significantly from the mean preference ranking of 2.64 (SD = .36) for plans developed by the behavior specialist alone.

The effect of plan developer (team working alone, team working with a behavior specialist, or behavior specialist working alone) was significant, $F(2, 22) = 9.79$, $p < .01$. The planned comparison, Team Involvement, revealed that preference rankings for plans developed by a behavior specialist alone were significantly lower than plans developed by a team alone or a team working with a behavior specialist, $F(1, 22) = 19.42$, $p < .01$. In this way, the data for preference rank yielded results similar to those for contextual fit. Preference rankings did not differ significantly between plans developed by a team alone and plans developed by a team working with a behavior specialist, $F(1, 22) = .16$, *ns*.

Vignette Comparison

Due to an error in counterbalancing, the four vignettes were not equally likely to appear with each plan developer group. Specifically, the vignette for Charles was more likely to be associated with teams working with a behavior specialist. This error raises a concern that the specific content of the Charles vignette may have contributed error variance to the findings. This concern cannot be completely eliminated. Table 6, however, provides the means and standard deviations for Technical Adequacy, Contextual Fit, and Preference Ranking across the four vignettes.

A between-subjects ANOVA indicated that there were no significant interactions between vignette and team composition for Contextual Fit, $F(4, 21) = .240$, *ns*; for Technical Adequacy, $F(4, 21) = .189$, *ns*; or for Preference Ranking, $F(4, 26) = .280$, *ns*. Main effects of vignette were also nonsignificant for Contextual Fit, $F(2, 21) = .696$, *ns*; for Technical Adequacy, $F(2, 21) = .105$, *ns*; and for Preference Ranking, $F(3, 26) = 1.911$, *ns*.

Discussion

The purpose of this study was to evaluate whether the composition of school-based teams (e.g., including members with knowledge of the student, the setting, and behavioral theory) affected the perceived technical adequacy and contextual fit of behavior support plans. Teams developed 36 behavior support plans from simulated vignettes and then evaluated the plans. Results suggest that participation by an individual with knowledge of behavioral theory increases the likelihood that the plan will be judged to have strong technical adequacy. The results further indicate that team membership by individuals who are knowledgeable about the setting increases the likelihood that the plan will be rated as having strong contextual fit. Only plans developed by teams with knowledge about the context, student, and behavioral theory, however, produced behavior support plans that were evaluated as both technically sound and contextually appropriate.

Effects of Plan Developer on the Technical Adequacy of Behavior Support Plans

The study revealed that behavior support teams were more successful at using FBA results to design behavior support

TABLE 6. Means and Standard Deviations for Contextual Fit, Technical Adequacy, and Preference Ranking Across Plan Developers and Vignettes

		Vignette							
		Charles		Isabel		Luis		Marianne	
Plan feature	Plan developer	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Contextual fit	BS only			79.38	6.63	74.55	12.87	74.88	9.21
	Team only			88.48	5.63	85.15	5.92	85.60	8.59
	Team + BS	88.05	3.19	87.15	3.61	88.85	1.20	79.95	17.04
Technical adequacy	BS only			14.33	1.42	15.00	.73	15.68	.29
	Team only			8.93	4.63	7.93	3.4	8.85	2.74
	Team + BS	14.02	.83	14.35	.49	13.65	.91	13.65	.49
Preference ranking	BS only			2.4	.54	2.73	.21	2.8	.18
	Team only			1.45	.52	1.63	.54	1.83	.62
	Team + BS	1.53	.59	1.55	.78	2.3	.00	1.95	.64

Note. BS = behavior specialist.

plans when the team included at least one person who was trained in both behavioral theory and the use of FBA data to design a behavior support plan. Plans developed by a behavior specialist working alone and plans developed by school-based teams working with a behavior specialist were scored by expert panelists as equally technically strong and statistically superior to plans developed by school-based teams working alone.

These findings support the hypothesis that school-based teams developing function-based behavior support should include a specialist trained in behavioral theory. The post-hoc analysis adds precision to this finding by emphasizing the role that a behavior specialist plays in linking intervention strategies to the controlling antecedents and consequences identified through the FBA. Plans developed with a behavior specialist were more likely to include strategies for both preventing the antecedent variables that occasion problem behaviors and limiting the natural reinforcers that maintain problem behaviors. Plans developed with a behavior specialist were also more likely to detail procedures for collecting ongoing evaluation data to assess and adapt the plan. This study suggests that school administrators should ensure that behavior support teams include members who collectively bring all three areas of knowledge: knowledge of the student, the setting, *and* behavioral theory.

Effects of Plan Developer on the Contextual Fit of Behavior Support Plans

Contextual fit refers to the extent to which the behavior support plan reflects the values, skills, resources, and administrative support of the school personnel (Horner, 2000; O'Neill et al., 1997; Sandler et al., 2002). The degree of contextual fit of an FBA-based behavior support plan will likely serve as a determining factor in the extent to which its interventions are implemented successfully.

The present results indicate that behavior support plans created by teams working with a behavior specialist and by teams working without a behavior specialist were rated equally for contextually fit. Team members rated behavior support plans created by behavior specialists alone as significantly less contextually appropriate, and they ranked-ordered such plans as the third choice for implementation. Post-hoc analysis indicated that team members found the plans developed by behavior specialists alone to include intervention procedures (a) with which they were less familiar, (b) that they did not feel were consistent with their personal values, (c) that were less focused on the best interest of the student, and (d) that were not perceived as efficient to implement.

This information suggests that school-based teams made up of team members who are knowledgeable about the student, the setting, *and* behavioral theory are able to develop technically strong behavior support plans that are also reflective of the team's skills, knowledge, resources, and beliefs. This research fills a gap in the current literature in that it provides information about the critical knowledge areas for school-based teams using FBA information to develop behavior support plans for students.

Implications for Behavior Support in Schools

The primary clinical message of this study is the need of behavior support teams to rely on the different forms of information that different members contribute. Team members who know the context and student well will provide important guidance to ensure that the elements of a behavior support plan are feasible and likely to be adopted. Team members with knowledge about both the theory of behavior and the use of behavioral theory in support plan design will ensure that information from FBAs guides the selection of behavior support plan strategies likely to change student behavior. Across the 12 teams in the present study, no one person had all the information needed to design a behavior support plan that had both high technical adequacy and high contextual fit.

Limitations

This study has several limitations, each of which should be considered when interpreting the findings. First, we recruited all participating teams from schools implementing a schoolwide positive behavior support (SW-PBS) approach (Lewis & Sugai, 1999), and as such, the team members may have been more knowledgeable about behavioral theory than team members in typical schools would be. Second, the behavior specialists were unknown to the team prior to the study. The team's lack of familiarity with the behavior specialist may have affected the behavior of the regular team members. In addition, the behavior specialist's lack of knowledge of the team members, the school, and its resources may have exaggerated the lack of contextual fit of the specialist's plan as rated by the team. Third, this study utilized hypothetical student vignettes. Team members were offered a one-page description of the student's presenting problem behavior, his or her background, and the context for the problem behavior. Although the use of hypothetical student vignettes allowed for increased statistical power, the vignettes likely provided more simplified descriptions of student problem behavior than teams would encounter in real situations. Finally, the fact that the vignettes were not properly counterbalanced should prompt caution for interpretation of the results and encourage formal replication.

Future Research

Future research should (a) investigate the critical features of training in behavioral theory necessary to help teams use FBA information to build technically sound behavior support plans; (b) use real students, real problem behaviors, and real behavior support plans to evaluate the technical adequacy and contextual fit of behavior support plans created by teams possessing all three knowledge areas; and (c) evaluate the fidelity of implementation and efficacy in changing student behavior of plans created by teams possessing all three knowledge areas.

The current research assessed the impact of including a behavior specialist on a behavior support team. Future research should evaluate the training needed to teach a behavior specialist how to lead teams through the development of behavior support plans that are both technically sound and have high contextual fit. This research is particularly important due to the apparent lack of correlation between self-perception of behavioral theory knowledge (as reported on the team self-report measure; see Table 1) and an individual's actual ability to lead a team through the process of using FBA information to develop a behavior support plan.

In this study, behavior support plan development occurred using "real" school-based teams; however, the behavior specialists were external members, and the students in the vignettes were hypothetical. This design allowed for increased statistical power and an increased ability to analyze results. Future research, however, should consider evaluating behavior support plans' technical adequacy and contextual fit using case studies in which both the team members and the referred student are regular members of the school community.

Similarly, as a result of the use of hypothetical student vignettes, the current study could not address how team membership and processes affected the fidelity of implementation of interventions and intervention effectiveness in improving student behavior. Future research in a natural setting should address these questions by collecting contextual fit and technical adequacy data preliminarily for each plan developer, and then monitoring the fidelity of implementation and effectiveness of the behavior support plan.

Conclusions

Behavior support plans developed by school-based teams that included team members with three areas of critical knowledge (knowledge of the student, of the setting, and of behavioral theory) were technically strong and were rated by team members as high in contextual fit. The results suggest that school-based teams striving to support all students, to efficiently allocate resources for training, and to meet the legal requirements for FBA and function-based support detailed in the 2004 reauthorization of IDEA should consider whether their team members have knowledge in all three critical areas. The research-to-practice gap in the development of function-based behavior support may persist. However, studies such as this will contribute to specific recommendations for school personnel regarding the most effective team structure and processes to develop technically strong function-based behavior support plans that match the school's resources and the team members' skills, knowledge, and beliefs.

AUTHORS' NOTES

1. The development of this paper was supported in part by Grant H324X010015 and Grant H324B030058, a Student Initiated Project, funded by the U.S. Department of Education, Office of Special Education Programs. Opinions expressed herein do not necessarily reflect the position of the U.S. Department of Education and such endorsements should not be inferred.
2. The authors extend appreciation to Dr. Claudia Vincent for editorial guidance in the development of this manuscript.

REFERENCES

Albin, R. W., Lucyshyn, J. M., Horner, R. H., & Flannery, K. B. (1996). Contextual fit for behavior support plans: A model for a goodness of fit. In L. K. Koegel, R. L. Koegel, & G. Dunlap (Eds.), *Positive behavior sup-*

port: Including people with difficult behavior in the community (pp. 81–98). Baltimore: Brookes.

Benazzi, L., Nakayama, N., Sterling, L., Kidd, K., & Albin, R. (2003, February*). Function-based support: Current practices and research findings.* The Oregon Conference 2003: Eugene, OR.

Bergstrom, M. K., Horner, R. H., & Crone, D. A. (2004). *School-based team members conducting functional behavioral assessments in the general education environment.* Manuscript submitted for publication.

Carr, E. G., Horner, R. H., Turnbull, A. P., Marquis, J. G., McLaughlin, D. M., McAtee, M. L., et al. (1999). *Positive behavior support for people with developmental disabilities.* Washington, DC: American Association on Mental Retardation.

Carr, E. G., Langdon, N. A., & Yarbrough, S. C. (1999). Hypothesis-based intervention for severe problem behavior. In A. C. Repp & R. H. Horner (Eds.), *Functional analysis of problem behavior: From effective assessment to effective support* (pp. 9–31). Belmont, CA: Wadsworth.

Crone, D. A., & Horner, R. H. (2003). *Building positive behavior support systems in schools: Functional behavioral assessment.* New York: Guilford Press.

Didden, R., Duker, P. C., & Korzilius, H. (1997). Meta-analytic study on treatment effectiveness for problem behaviors with individuals who have mental retardation. *American Journal of Mental Retardation, 101,* 387–399.

Elliot, S. N., Witt, J. C., Kratochwill, T. R., & Callan-Stoiber, K. (2002). Selecting and evaluating classroom interventions. In M. R. Shinn, H. M. Walker, & G. Stoner (Eds.), *Interventions for academic and behavior problems II: Preventative and remedial approaches* (pp. 243–294). Bethesda, MD: National Association of School Psychologists.

Filter, K. (2003). *The functional relationship between academic variables and problem behavior: A model assessment and intervention in the classroom.* Unpublished doctoral dissertation, University of Oregon.

Horner, R. H. (2000). Positive behavior supports. *Focus on Autism and Other Developmental Disabilities, 15*(2), 97–105.

Horner, R. H., Albin, R. W., Sprague, J. R., & Todd, A. W. (2000). Positive behavior support. In M. E. Snell and F. Brown (Eds.), *Instruction of students with severe disabilities* (pp. 47–83). Columbus, OH: Merrill.

Horner, R. H., Sugai, G., Todd, A. W., & Lewis-Palmer, T. (2005). School-wide positive behavior support. In L. Bambara & L. Kern (Eds.), *Individualized supports for students with problem behaviors: Designing positive behavior plans* (pp. 359–390). New York: Guilford Press.

Hsiao, Y., & Albin, R. W. (2000, May). *The effects of functional assessment information on the behavioral support recommendations for school personnel.* Paper presented at the Association for Behavior Analysis Convention, Washington, DC.

Individuals with Disabilities Education Act amendments of 1997, 20 U.S.C. § 1400 *et seq*.

Individuals with Disabilities Education Act reauthorization of 2004, 20 U.S.C. § 1400 *et seq*.

Ingram, K., Lewis-Palmer, T., & Sugai, G. (2005). Function-based intervention planning: Comparing the effectiveness of function-based and non-function-based intervention plans. *Journal of Positive Behavior Interventions, 7*(4), 224–236.

Keppel, G., & Zedeck, S. (1989). *Data analysis for research designs.* New York: Freeman.

Lewis, T. J., & Sugai, G. (1999). Effective behavior support: A systems approach to proactive school-wide management. *Effective School Practices, 17*(4), 47–53.

Lewis-Palmer, T., Todd, A. W., Horner, R. H., Sugai, G., & Sampson, N. (2004). *Individual student systems evaluation tool*. Eugene: Educational and Community Support, University of Oregon.

Miltenberger, R. (1990). Assessment of treatment acceptability: A review of the literature. *Topics in Early Childhood Special Education, 10*(3), 24–38.

Mitachi, M., & Albin, R. W. (2001). *The effects of functional assessment information on the behavioral support recommendations of school personnel*. Presentation at the 27th annual convention of the Association for Behavior Analysis, New Orleans, LA.

Nelson, J. R., Roberts, M. L., Mathur, S. R., & Rutherford, R. B., Jr. (1998). Has public policy exceeded our knowledge base? A review of the functional behavioral assessment literature. *Behavior Disorders, 24*(2), 169–179.

Newcomer, L. L., & Lewis, T. J. (2004). Functional behavioral assessment: An investigation of assessment reliability and effectiveness of function-based interventions. *Journal of Emotional and Behavioral Disorders, 12*(3), 168–181.

O'Neill, R. E., Horner, R. H., Albin, R. W., Sprague, J. R., Storey, K., & Newton, J. S. (1997). *Functional assessment and program development for problem behavior: A practical handbook*. (2nd ed.), Pacific Grove, CA: Brooks/Cole.

Prasse, D. (2002). Best practices in school psychology and the law. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology IV* (pp. 57–75). Washington, DC: National Association of School Psychologists.

Salantine, S. P., & Horner, R. H. (2002). *The contextual fit questionnaire*. Eugene: University of Oregon.

Sandler, L., Albin, R. W., Horner, R. H., & Yovanoff. (2002). *Contextual fit and the viability of behavior support plans*. Unpublished manuscript.

Sugai, G., & Horner, R. H. (2002). The evolution of discipline practices: School-wide positive behavior supports. *Child & Family Behavior Therapy, 24*(1/2), 23–50.

Sugai, G., Horner, R. H., & Gresham, F. M. (2002). Behaviorally effective school environments. In M. R. Shinn, H. M. Walker, & G. Stoner (Eds.), *Interventions for academic and behavior problems II: Preventative and remedial approaches* (pp. 315–350). Bethesda, MD: National Association of School Psychologists.

Sugai, G., Horner, R. H., & Sprague, J. R. (1999). Functional-assessment-based behavior support planning: Research to practice to research. *Behavioral Disorders, 24*(3), 253–257.

Walker, H. M., Colvin, G., & Ramsey, E. (1995). *Antisocial behavior in schools: Strategies and best practice.* Pacific Grove, CA: Brooks/Cole.

Walker, H. M., Horner, R. H., Sugai, G., Bullis, M., Sprague, J. R., Bricker, D., et al. (1996). Integrated approaches to preventing antisocial behavior patterns among school-age children and youth. *Journal of Emotional and Behavioral Disorders, 4,* 194–209.

Walker, H. M., & Shinn, M. (2002). Structuring school-based interventions to achieve integrated primary, secondary, and tertiary prevention goals for safe and effective schools. In M. R. Shinn, H. M. Walker, & G. Stoner (Eds.), *Interventions for academic and behavior problems II: Preventative and remedial approaches* (pp.1–25). Bethesda, MD: National Association of School Psychologists.

Yell, M. L., & Shriner, J. G. (1997). The IDEA Amendments of 1997: Implications for special and general education teachers, administrators, and teacher trainers. *Focus on Exceptional Children, 30,* 1–19.