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Supervision Strategies for Treatment Fidelity and Job Satisfaction in Applied Behavior Analysis Services

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Abstract

Supervising behavior technicians in the implementation of services derived from the science of applied behavior analysis with children diagnosed with autism spectrum disorder (ASD) is a common practice for behavior analysts. However, there is limited training available on supervision strategies for those applying this model of services. Lack of training can lead to ineffective and inconsistent supervisory practices, resulting in low rates of job satisfaction for supervisees and variable fidelity in treatment implementation. The quality of supervision can improve job satisfaction and treatment fidelity. This study was conducted using a nonconcurrent multiple baseline design across participants to evaluate the effects of an evidence-based approached to supervision on treatment fidelity and job satisfactory for three behavior technicians providing services for a child with ASD. Each of the three technicians demonstrated improved levels of treatment fidelity and increased job satisfaction across several facets of their job during the intervention and maintenance phase. Implications of these findings, limitations of this study, and suggestions for future research are included.

Keywords:

Supervision, Job Satisfaction, Applied Behavior Analysis, Behavior Technician, Treatment Fidelity

Introduction

Oftentimes behavioral treatment derived from applied behavior analysis (ABA) is delivered in a tiered model (Council of Autism Service Providers [CASP], 2020). This tiered model typically consists of a behavior analyst who is licensed (Association of Professional Behavior Analysts [APBA], 2022) and/or board certified (Behavior Analyst Certification Board [BACB], 2022), supervising the direct services of a behavior technician. In this model, the supervising behavior analyst is expected to provide the technician with training on treatment protocols specific to those receiving the services as well as ongoing supervision to ensure treatment recommendations are delivered with fidelity. For individuals receiving ABA-based services, a customized treatment plan is developed by the supervising behavior analyst to include skill acquisition as well as a behavior increase and reduction protocol when appropriate. The technicians are expected to implement the detailed protocol as outlined in

each treatment plan to assist the individual receiving treatment in achieving their individualized goals. The protocols include, but are not limited to, conducting teaching procedures, recording accurate data on client behaviors, delivering prompting strategies as outlined, and using potent reinforcers effectively (Cooper et al., 2019).

Within the field of ABA there are high rates of technician turnover (Sundberg, 2016). Turnover can inadvertently effect treatment fidelity as well as the progress consumers make (Mandell et al., 2013; Wine et al., 2020). Retaining trained technicians is a priority because of the specialized training and oversight invested by the supervising behavior analyst when working with individuals with autism spectrum disorder (ASD), not only for the employer funding the training but also for those receiving the ABA-based treatment.

Job satisfaction and intention to leave have been linked to the quality of supervision received (e.g., training received, communication, recognition received by the supervisor) and level of competency to do the job (Kazemi et al., 2015; Wilson, 2015). In traditional work environments a supervisor commonly refers to the person whom the employee reports and may complete employment reviews and determine promotions. In ABA-based services, the term supervisor is most often used to refer to the supervisor of a trainee (i.e., individual accruing fieldwork experience and seeking certification) or that of a supervisee (i.e., individual implementing behavioral services [BACB, 2020]). For the purposes of this paper, the term clinical supervision/supervisor will be used for the supervision of a supervisee delivering ABA-based services for an individual.

In the tiered model of services found in ABA, the clinical supervisor will often have the most direct and frequent exposure to the technician. There is a tremendous investment required of the clinical supervisor in training behavior technicians on their teams; each program is personalized for the individual receiving treatment, requiring specific training on protocols and ongoing oversight provided to a behavior technician by a Board Certified Behavior Analyst (BCBA; BACB, 2014; Odom et al., 2010; Volkmar et al., 2014). Having a tool that supports job satisfaction and retention of trained behavior technicians who can implement protocols with fidelity would provide meaningful change for organizations that offer ABA-based services for individuals with autism.

Employees who are provided with quality supervision and training are more satisfied with their job (Collins et al., 2008; Eisenberger et al., 2002; Mor Barak et al., 2009; Parsons et al., 2003; Reid et al., 2011). Studies show that there is a relationship between the satisfaction level of an employee and employee turnover (Kuo et al., 2014; Sageer et al., 2012). Research has indicated that improved treatment implementation can be achieved by providing specific goals, training to mastery, and giving direct feedback to implementers (DiGennaro-Reed et al., 2011; Miles & Wilder, 2009; Parsons et al., 2012; Sarokoff & Sturmey, 2004) and that job satisfaction can be improved as competency is built (Wilson, 2015).

Importance of Treatment Fidelity

A substantial challenge to intervention is behavioral drift on the part of the implementor in the application of intervention, resulting in protocols being implemented incorrectly or not to fidelity (Allen & Warzak, 2000). Even when the most effective procedure is being recommended by a clinical supervisor, if that intervention is not being implemented to fidelity it could be compared to an individual taking half of their prescribed medication (Miller & Rollnick, 2014). The importance of measuring treatment fidelity was illustrated by Rodriguez et al. (2009) whose findings showed a decrease in problem behavior for three children enrolled in school programs when their teachers scored higher on treatment fidelity measures. Teachers with lower fidelity scores showed minimal decrease in problem behavior. Although more research is needed on the effects of treatment fidelity, high quality implementation can impact results of an intervention (Thijssen et al., 2017). Many times, a behavior technician that has not mastered a skill can practice mistakes leading to problems with treatment outcomes (DiGennaro-Reed et al., 2011).

A key component of ABA-based services is delivering prompts and reinforcement at the rate defined by the clinical supervisor. The timing of delivery is important because the implementer risks missing an opportunity to prompt or reinforce the behavior of interest, inadvertently reinforcing undesirable behaviors (Cooper et al., 2019; Mayer et al., 2012). For example, when considering the target behavior of a child vocally stating the word bird at the presentation of the image of a bird on a picture card, the behavior technician will present the card and should provide a short delay (i.e., 2-3 s) to allow a response. If the child responds within the specified time with the vocal utterance bird, a prescribed reinforcer is delivered; if there is no utterance, a prescribed prompt can be delivered. If, in this example, the technician waits 10 s for a response and during the 10 s delay the child looks at their mother and then says the vocal utterance bird, receiving reinforcement for that vocal utterance, the behavior technician may have reinforced labeling the client's mother with the vocal utterance bird. In this example, latency in the delivery of reinforcement is critical to the fidelity of the intervention.

Importance of Job Satisfaction

Interventions derived from the science of ABA have been highly successful in helping to improve the developmental delays of children with ASD and studies show evidence of the significant benefits for improving quality of life (Ben-Itzchak & Zachor, 2007; Eldevik et al., 2012; Leaf et al., 2011; Lovaas, 1987; Rogers & Vismara, 2008). However, Grindle et al. (2009) discussed the limited research on parents' perceptions of the effects of ABA-based services for their children. Grindle et al. explored parent perceptions by interviewing parents (i.e., 32 mothers and 21 fathers) who received 2 years of ABA-based services about their experience in home-based services. Grindle et al. presented findings indicating most parents recognized the benefits of 2 years of ABA-based services for their child and their child achieved growth in developing new skills and reduced challenging behaviors.

Grindle et al. (2009) went further to offer a summary of frequently occurring concerns shared by parents. Difficulties with direct support staff were expressed by 91% of mothers and 100% of fathers. The difficulties included challenges with recruiting new therapists and high turnover rates, causing disruption to their program. Parents felt that the challenges related to recruitment and retention slowed progress for their child. In addition, parents of children receiving ABA-based services feel that maintaining a strong rapport with their intervention team allows for more successful outcomes (Grindle et al., 2009). Leach (2005) surmised that well-established positive rapport has a direct effect on outcomes of treatment. When a behavior technician with whom a family has a strong bond resigns, the family's trust could weaken for the entire organizations and its ABA-based program.

The behavior technician's role is oftentimes entry level; this means that many behavior technicians have little to no experience or training prior to starting in their first position. Although offering treatment in a tiered model helps to keep costs low for those funding treatments, it places a heavy burden on the employer to train those individuals (Wood et al., 2007). It is important to consider that the population receiving services can be vulnerable and requires skilled and carefully planned treatment implementation and oversight by the supervising behavior analyst.

Any level of turnover results in high costs for organizations. Sundberg (2016) asserted that the average cost of turnover for a behavior technician to the organization can be as high as $5,000 per person. In addition to the expected costs associated with turnover, such as advertising fees, recruitment, and orientation (Abbasi & Hollman, 2000), there are also hidden costs such as decreased morale, decreased consumer relations, and damaged organizational reputation. When a behavior technician resigns, there are direct consequences to the consumers, sometimes resulting in the decision to terminate services, submit complaints or find another provider to work with. Employees who are satisfied are more loyal (Sageer et al., 2012) and more likely to be retained.

Collins et al. (2008) found that employee retention is a catalyst to consumer satisfaction and relations. These findings are supportive of Geyer's (2005) argument that there is a need for improved training, through evidence-based supervisory interventions, to improve employee satisfaction. Collins et al.'s (2008) results showed that more satisfied employees do a better job and make their patients happier. Businesses should focus on preserving highly trained employees that they have within their organization by enhancing job satisfaction through the supervision and training programs offered to employees (Abbasi & Hollman, 2000).

Ganster et al. (2011) stated, "How individuals are rewarded at work is perhaps one of the most salient features of the work environment and can serve as a source of satisfaction, challenge and fulfillment or a source of uncertainty, mistrust and perceived inequity" (p. 224). It is essential that a model of reinforcement and reward be incorporated into supervision as part of maintaining satisfaction and staff retention for ABA-based service providers if those are desired behaviors to increase.

Connecting Supervision, Job Satisfaction, and Treatment Fidelity

Job satisfaction is a vital aspect of consideration for supervisors (Kazemi et al, 2015; Reid et al., 2021). The measurement of job satisfaction for human service providers directly correlates to employee effort, interactions with consumers, and even absenteeism (Reid et al., 2021). There are many factors that can contribute to employee satisfaction and retention, but a key controllable variable is the supervisor's efforts towards fostering a motivating work environment. Regrettably, opportunities for supervisors to provide immediate reinforcement (e.g., praise, support, training) to behavior technicians is commonly limited to supervision sessions. Additionally, many behavior analysts are not trained or fluent in supervisory practices and consequently those practices can be applied inconsistently. As such, behavior technicians may leave their position because of lack of supervisor-directed reinforcement, lack of effective training on interventions, or lack of motivation to keep them in their role.

Guidelines for effective supervision strategies are emerging (e.g., BACB, 2018; Reid et al., 2011; Sellers et al., 2016; Turner et al., 2016). When a supervisor does not have a structured model, there is room for variability and possibly inadequate supervision that could lead

to dissatisfied employees (Green et al., 2002). When an employee feels valued by the supervisor, there is a decrease in rates of turnover (Eisenberger et al., 2002). A positive relationship between employees and their supervisors is a strong indicator of employee productivity and retention (Kuvaas & Dysvik, 2010). As previously discussed, behavior analysts who are supervising the direct services of technicians are required to provide hands-on training of interventions. Kazemi et al. (2015) examined turnover of technician-level interventionists working with individuals with ASD through an extensive survey. Kazemi et al. evaluated several aspects of turnover in ABA-based services and found that 38% of the 96 respondents were likely to leave their position because they were not satisfied with their supervision, training, and pay. Notably, Kazemi et al. expressed that pay level was not indicative of satisfaction, meaning the amount the technician was paid varied and satisfaction with the amount was subjective.

Simply providing generic supervision to technicians is not enough to ensure they are supported and equipped to not only perform, but also to sustain their role. The BACB (2018) recently released an updated supervision curriculum. This is a great step and provides necessary guidance; however, there continues to be a need to build access to trainings and improve supervisory practices. To improve behavior technicians training, Reid et al. (2017) suggested that clinical supervisors not only supervise the direct services of assigned clients, but also have a collaborative approach with all aspects of the behavior technician's employment from the start of hire. Furthermore, Gibson et al. (2009) surmised that perceived supervisor support was connected to technicians strong or weak feelings of accomplishment and emotional exhaustion. When a technician perceives they are supported by the supervisor, there is less emotional exhaustion and a greater feeling of achievement in their work. The supervising behavior analysts must not only focus their time on the case supervision (i.e., ensuring programing is individualized and appropriate for the consumer), but also the relationship they have with their supervisees. It is a difficult challenge for behavior analysts, especially when considering all the duties involved in their role. Achieving treatment fidelity can be a challenge; therefore, strategies to ensure that there be consistent supervision that incorporate opportunities to evaluate and maintain skills are essential (Carr et al., 2013).

The findings in the literature suggest that supervisory methods are linked to improved treatment fidelity and job satisfaction. Essentially when an employee is doing a good job, they are happier at that job. When employees are provided with quality supervision, they are more loyal, less likely to quit, more productive in their work, and are better service providers. Moreover, job satisfaction and retention lead to consumer satisfaction and lower turnover costs for the employing organization. Much of the research in employee satisfaction and retention has mainly been derived by employee and supervisor reports via survey, such as that used by Collins et al. (2008). The purpose of the present study was to evaluate the effects of the Supervisor Training Curriculum: Evidence-Based Ways to Promote Work Quality and Enjoyment Among Support Staff (Reid et al., 2011) when applied to clinical supervision with behavior technicians as it relates to treatment fidelity and job satisfaction. The supervision training used was interpreted as an intervention package that included modifying the level, quality, and expectations related to the performance of a clinical supervisor who provided oversight to three behavior technicians.

Method

Participants

Three behavior technicians participated in this study. All potential candidates volunteering to participate must had worked at the research site for a minimum of 6 months to be eligible. Participants were offered an opportunity to volunteer and were selected at random by an administrative assistant. Any behavior technicians who volunteered but were not assigned to shared cases with the selected a selected clinical supervisor were excluded from participation. This exclusionary criterion was established because the study required that the clinical supervisor who was selected to implement the intervention have prior supervisory experience with the technician and the analyst and technicians had a shared case assignment at the time of the study. The three technicians were selected at random from those who volunteered and were not excluded. Participants were all females with an age range of 27-52 years, were employed at the site for a range of 8 months to 11 years, two participants identified as white, and one participant identified as black. Educational backgrounds varied, with participants holding bachelor level degrees in psychology and social work, and a master's degree in behavior analysis. Each technician was trained in the implementation of protocols written by a behavior analyst and using prompting and reinforcement delivery systems. Each technician met minimum competencies as required of their job, requiring a minimum score of 80% before beginning direct service with clients. The competency checklist was composed of 17 subject areas that required formal training related to the role of a behavior technician.

Setting

This study was conducted at an agency in the Northeast providing home, school, and clinic-based intervention for individuals between birth and 21

years of age. The intervention was conducted with three behavior technicians delivering ABA services for a child diagnosed with ASD, aged 2.5 years, in the child's home setting under the clinical supervision of a certified behavior analyst.

Dependent Variables

One variable evaluated was treatment fidelity, the measure in which the behavior technicians implemented protocols as designed. For the purposes of this study, specific components of the treatment protocol were identified as the targets. The identified targets were the latency between the delivering a discriminative stimulus and the delivery of a prompt, the latency between the delivery of reinforcement between the prompted or independent behavior, and missed opportunities to deliver a prompt or reinforcement.

Another variable that was evaluated during the study was job satisfaction. This study used the Job Descriptive Index-Job in General ([JDI-JIG] Bowling Green State University, 2009) to measure the level of job satisfaction the behavior technicians had before and after the intervention. The JDI-JIG requires the employees to consider specific components of their job as well as their job in general and rate their level of satisfaction across each. The JDI-JIG components evaluated by the participants in this study were their level of satisfaction in their (a) work on present job, (b) pay, (c) opportunities for promotion, (d) supervision, (e) people on present job, and (f) job in general. For the section related to work on present job and supervision, the technicians were asked to think specifically about case that they were to be illustrating in the study and the supervision they are receiving from the assigned clinical supervisor on that case. All other responses related to pay, opportunities for promotion, people on present job, and job in general were to be reflection on their attitude in each area across all aspects of their job. This served not only as a tool for measuring job satisfaction, but also as a social validity measure of the intervention itself.

Data Collection

For the three phases in this study (i.e., baseline, intervention, and maintenance), trained observers recorded video samples of the latency of delivering prompts and reinforcement by the technicians across multiple. Data were recorded using a paper data sheet and the time stamp located on each video sample. The use of video samples allowed the observer to pause and rewind to increase the likelihood of accuracy in the data. The data sheet was designed to allow the observer to document the recorded latency or an absence of delivering a prompt or reinforcement by the technician. Delivering prompts was defined as the technician providing the client with one of the following teaching prompts during a teaching trial: full or partial physical prompt, full or partial verbal prompt, gestural or a model prompt.

Delivering reinforcement was defined as the technician delivering an item to the client that had been established as reinforcing through a preference assessment conducted at the onset of each session. Latency was defined as the amount of time recorded between the delivery of a discriminative stimulus by the technician and the delivery of a prompt or a reinforcer. During each video sample, there were several opportunities to deliver reinforcement or prompts. Each trial conducted by the technician offered an opportunity for delivery of prompts or reinforcement; an absence of delivering either was recorded as such.

During the baseline and maintenance phase of the study, the JDI-JIG was used to provide a measure of job satisfaction in numerical form with a top score of 54 for each facet. The percentage of job satisfaction was determined by measuring the actual score and dividing it by the total possible score to provide a percentage that was applied as level of job satisfaction for the specified facet across two phases of the intervention. The scores indicated the level of job satisfaction the participant had prior to receiving the intervention (i.e., during baseline) and after receiving the intervention (i.e., during maintenance).

General Procedures

The clinical supervisor completed 14 hr of group training across two days and was required to display mastery for each module. Attendees to the training received an individual trainee guide and handouts to keep as reference tools. All trainees attending were required to engage in role-play activities and be active in discussions related to each of the 11 modules. To confirm the attendees were able to correctly implement the evidence-based methods in the supervision intervention package, there was a required on-the-job competency assessment that evaluated generalization. A generalization competency assessment was used to evaluate the clinical supervisor implementing all relevant strategies with a supervisee in the natural setting, requiring a minimum of 90% accuracy to meet competency.

A nonconcurrent multiple baseline design across subjects was used to measure the effectiveness of the supervisor training intervention (Reid et al., 2011) on the behavior technicians' treatment fidelity. There were three phases (i.e., baseline, intervention, and maintenance) in this study across three participants. During the baseline phase, a measure of current performance was recorded for each participant prior to receiving the intervention. The intervention phase was staggered across all three participants to ensure

that the onset of the intervention phase occurred across different times. The maintenance phase began for participants once it was determined that mastery was achieved. During the maintenance phase, the clinical supervisor discontinued providing supervision for the established protocol, and fidelity continued for a minimum of four sessions across several weeks. The supervising behavior analyst provided a job duties checklist detailing expectations and reviewed progress and errors using diagnostic performance feedback during supervision sessions as well as formal and informal performance monitoring. The supervisor continued to train using the strategies outlined in the supervision training package until the technicians were accurately implementing the protocol as designed.

Baseline

During baseline, video samples were recorded of the behavior technician implementing a protocol designed to teach gross motor imitation skills and a protocol designed to teach matching skills with their client. The client and protocols were the same across all three participants. Both protocols called for a continuous schedule of reinforcement for all prompted and independent behaviors. The behavior technicians were expected to avoid missed opportunities and to prompt and reinforce responses. The video samples were reviewed, and a baseline measure was determined for each participant prior to the onset of the intervention measuring the latency between the delivery of a discriminative stimulus and the delivery of a reinforcer or the latency of the delivery of the prompt and reinforcer. The latency of the delivery of prompting and reinforcement was determined as the time in which it took for the technician to deliver the choice response (i.e., prompt or reinforcement) during a teaching procedure. Missed opportunities for the delivery of prompts or reinforcement were also measured using frequency of occurrence per video sample. During each session, a video sample was recorded to allow for more accurate measurement, opportunities to attain interobserver agreement, and were used during the feedback sessions in which the supervising behavior analyst was not present at the live session.

During the baseline phase, each participant was required to complete a survey that measured their level of job satisfaction, the JDI-JIG. The survey results were not shared with the supervising behavior analyst, and results did not have any bearing on the employment status of the participant. The purpose was to establish a baseline level of job satisfaction prior to the intervention and to measure job satisfaction again post intervention to compare results and evaluate any changes.

Intervention

The intervention phase was staggered across all three participants. Although the researcher preferred to have a minimum of three points of reference prior to termination of a baseline phase, it was determined by the supervising behavior analyst to begin intervention or Participant 1 after only having two data points for reference in baseline. Participant 1 was scheduled to implement sessions with the client a frequency of one time per week, whereas other participants had several sessions scheduled per week with the same client. The limited frequency that Participant 1 had sessions with the client was a potential challenge, as it was important to the behavior analysts that the protocol be implemented to fidelity as soon as possible. During baseline, behavior challenges were identified, and it was hypothesized that they could have been related to the lack of fidelity with the targets being measured. It was determined that, for the well-being of the client, Participant 1 begin the intervention phase no later than by the third session.

The latency of the choice response (i.e., prompt or reinforcement) and missed opportunities for delivering prompts and reinforcement during video sample was recorded in the same way they were recorded at baseline. During the intervention phase, the supervising behavior analyst began by providing each technician with a job duties checklist that detailed expectations of the delivery of prompts and reinforcement, reviewed the job duties checklist, provided modeling of the expectation, observed implementation, and provided diagnostic performance feedback during direct supervision sessions (Reid et al., 2011).

Diagnostic feedback included the written and verbal description of expectations on delivering prompts or reinforcement with immediacy and as designed. The clinical supervisor modeled the expected behaviors by implementing the protocols (i.e., gross motor imitation and matching using discrete trial training) and delivering reinforcement within the required 1-3 s or prompts within the required 2-5 s during sessions with zero missed opportunities. The technician was then observed in person and in a video sample implementing discrete trial training procedures with several opportunities for the delivery of reinforcement or prompts. The technician received ongoing feedback throughout supervision that included praise for correct action and a detailed description of incorrect action.

To ensure reliability, the same clinical supervisor provided the supervision across all three participants with the same client using the same teaching protocols. Each video sample was reviewed by two separate observers who were provided with the definition of the target behaviors. The evaluators collected data on the latency of the delivery of

prompts or reinforcement and missed opportunities for each videotaped session. The information was used to determine readiness for phase changes, behavior changes, treatment fidelity, and to attain a measure of interobserver agreement.

Maintenance and Generalization

To determine if the technicians maintained the skills acquired during the intervention phase, maintenance probes were conducted across a minimum of four and a maximum of nine sessions, where the technicians returned to baseline conditions and data were collected in the same manner as Phase 1 and Phase 2. Although it would have been ideal to have also included opportunities to probe generalization, the participants were unable to attain consent to collect video samples during sessions with clients other than the shared case assignment identified for the study.

Interobserver Agreement

To ensure reliability, data were recorded of the participants implementing procedures across numerous videotaped samples during each phase. Two trained observers viewed the video recordings and collected data on percentage of sessions. A total agreement-recording formula was used to calculate the percentage of agreement between observers (Gast, 2010). The mean percentage of agreement for latency to prompt across participants was 92% (range, 90-93%) at baseline, 97% (range, 92.4-100%) during the intervention phase, and 94% (range, 83-100%) during the maintenance phase. The mean percentage of agreement across participants for latency to reinforcement was 97% (range, 94-100%) at baseline, 97% (range, 91.2-100%) during the intervention phase, and 99% (range, 95.5-100%) during maintenance. The mean percentage of agreement across participants for missed opportunities was 98% (range, 93-100%) at baseline, and 100% agreement across both the intervention and maintenance phases.

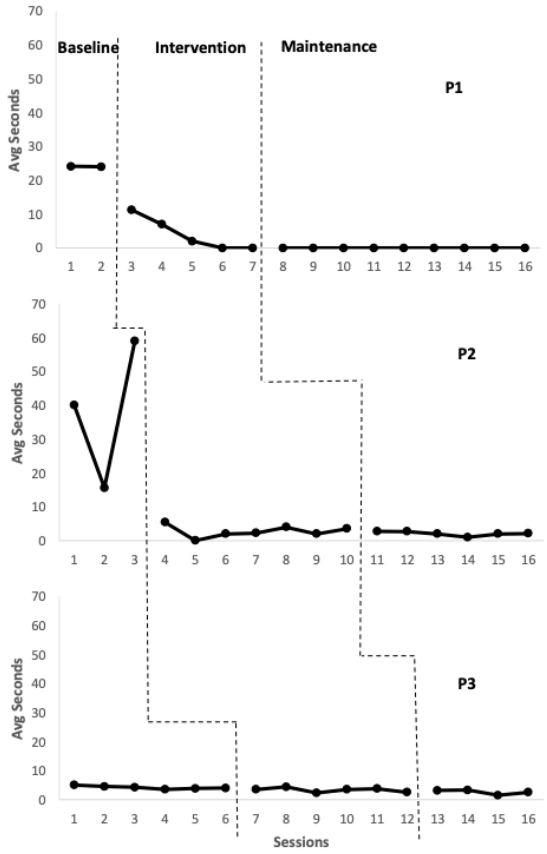
Results

Data Analysis of Treatment Fidelity

Each participant showed variability in the latency of the delivery of prompts or reinforcement at baseline. In addition, each participant showed missed opportunities beyond the expected threshold of three during baseline. Results for the latency of the delivery of prompts are presented in Figure 1. During the baseline condition, Participant 1 had an average latency of 24.07 s for the delivery of prompts, Participant 2 had an average latency of 38.02 s for the delivery of prompts, and Participant 3 had an average latency of 4.1 s for the delivery of prompts, indicating within criterion mastery at baseline.

Figure 1

Latency to prompt



Note: This graph depicts results for three behavior technicians and latency of the delivery of prompts. Data are reported as the average latency for each participant across session samples during three phases: baseline, intervention and maintenance.

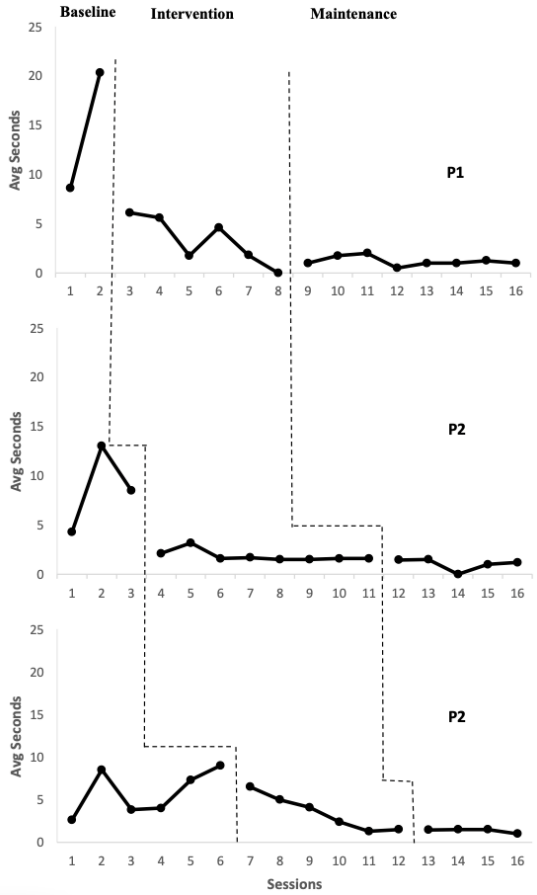
Participant 1 reached criterion for the delivery of prompts after three intervention sessions and continued to receive intervention for an additional two sessions before returning to baseline conditions at session eight; the average latency during the intervention phase for the delivery of prompts reduced to 4.05 s. Participant 2 reached criterion for the delivery of prompts after two intervention sessions and continued to receive intervention for an additional five sessions before returning to baseline conditions at session 10; the average latency during the intervention phase for the delivery of prompts reduced to 2.7 s. Participant 3 had already established achievement of mastery criterion for the delivery of prompts at baseline; however, to ensure consistency across all targets being measured, intervention was implemented for six sessions. The latency of delivery of prompts did show a slight reduction to an average of 3.3 s before returning to baseline conditions at Session 12.

Participant 1 had eight maintenance sessions over several weeks. The average latency for delivery of prompts maintained at or below the established criteria for all maintenance sessions. Participant 2 had six maintenance sessions. The average latency

for delivery of prompts maintained at or below the established criteria for all maintenance sessions. Participant 3 had four maintenance sessions. The average latency for delivery of prompts maintained at or below the established criteria for all maintenance sessions. Results for the latency of the delivery of reinforcement are presented in Figure 2. During baseline, Participant 1 had an average latency of 14.46 s for the delivery of reinforcement, Participant 2 had average latency of 8.5 s for the delivery of reinforcement, and Participant 3 had an average latency of 5.87 s for the delivery of reinforcement.

Figure 2

Latency to Reinforcement



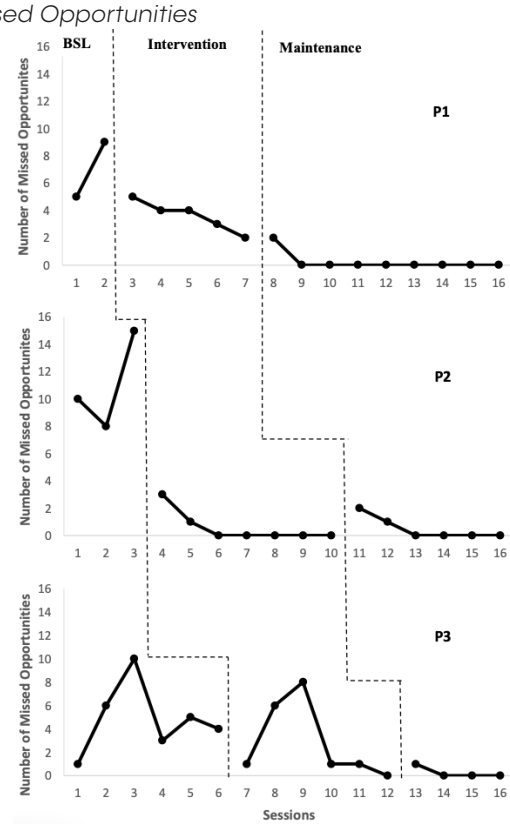
Note: This graph depicts results for three behavior technicians and latency of the delivery of reinforcement. Data are reported as the average latency for each participant across session samples during three phases: baseline, intervention and maintenance.

Participant 1 reached criteria for the delivery of reinforcement after two intervention sessions before returning to baseline conditions at session eight. The average latency for delivery of reinforcement reduced to 3.31 s from the 14.46 s recorded at baseline. Participant 2 reached criterion for the delivery of reinforcement after one intervention session before returning to baseline conditions at session 10. The average latency for delivery of reinforcement reduced to 1.85 s from the 8.5 s at baseline. Participant 3 reached criterion for the delivery of reinforcement after one intervention session before returning to baseline conditions at Session 12. The average latency for delivery of reinforcement reduced to 3.46 s from the 5.87 s recorded at baseline. The average latency of the delivery of reinforcement for all participants maintained at or below the established criteria of no more than a 3 s latency between the required response and the delivery of an established reinforcer for all maintenance sessions.

Results for missed opportunities to deliver a prompt or reinforcement are presented in Figure 3. During baseline, Participant 1 missed opportunities to provide reinforcement or prompts on an average of seven opportunities. Participant 2 missed opportunities to deliver prompts or reinforcement on an average of 11 opportunities. Participant 3 missed opportunities to deliver reinforcement or prompts on an average of five opportunities. During intervention, the average number of missed opportunities reduced to three per session sample for Participant 1, zero missed opportunities per session sample for Participant 2, and the average number of missed opportunities reduced to three per session sample for Participant 3. All participants were exposed to probes across several weeks. Participant 1 had eight maintenance probes, Participant 2 had six probes, and Participant 3 have four maintenance probes. The average number of missed opportunities maintained at or below the established criteria of no more than three per session sample for all maintenance sessions.

Figure 3

Missed Opportunities



Note: This graph depicts results for three behavior technicians and missed opportunities to deliver a prompt and/or deliver reinforcement. Data are reported as the number of missed opportunities for each participant across session samples during three phases: baseline, intervention and maintenance.

Data Analysis of Employee Satisfaction

Results for Participant 1 on the JDI-JIG are presented in Table 1. Results indicated a baseline level of 55% for work on present job, which increased to 78% during the maintenance phase. The percentage of job satisfaction for pay was 59% and increased to 70% during the maintenance phase. In the facet of opportunities for promotion, Participant 1 had a job satisfaction score of 48% that increased to 70% when measured in maintenance. The supervision facet score was 61% at baseline and increased to 93% when measured during the maintenance phase. The score under people on your present job for Participant 1 was 80% at baseline and increased to 87% during the maintenance phase. The general score under job in general was 87% for Participant 1 at baseline, and increased to 91% after the intervention in the maintenance phase. Data are reported as percentages of job satisfaction across six facets.

Table 1
Results by Percentage for Participant 1

Item	Baseline	Maintenance
Work on present job	55	78
Pay	59	70
Opportunities for promotion	48	70
Supervision	61	93
People on your present job	80	87
Job in general	87	91

Results for Participant 2 on the JDI-JIG are presented in Table 2. Results indicated a baseline level of 80% for work on present job which increased to 89% during the maintenance phase. The percentage of job satisfaction for pay was 67% and increased to 70% during the maintenance phase. In the facet of opportunities for promotion, Participant 2 had a job satisfaction measure of 78% that remained stable, scoring the same 78% when measured in maintenance. The supervision facet score was 63% at baseline and increased to 96% when measured during the maintenance phase.

Table 2
Results by Percentage for Participant 2

Item	Baseline	Maintenance
Work on present job	80	89
Pay	67	70
Opportunities for promotion	78	78
Supervision	63	96
People on your present job	85	96
Job in general	87	96

The score for people on your present job for Participant 2 was 85% at baseline and increased to 96% during the maintenance phase. The general score of job in general was 87% for Participant 2 at baseline, and it increased to 96% after the intervention in the maintenance phase. The JDI-JIG scale provided a measure of job satisfaction in numerical form with a top score of 54 for each facet. The percentage in this table was determined by measuring the actual score and dividing it by the total possible score to provide a percentage that was applied as level of job satisfaction for the specified facet across two phases of the intervention. The scores indicated the level of job satisfaction the participant had prior to receiving the intervention (i.e., baseline) and after receiving the intervention (i.e., maintenance).

Results for Participant 3 on the JDI-JIG are presented in Table 3. Results indicated a baseline level of 55% for work on present job, and the level increased to 77% during the maintenance phase. The percentage of job satisfaction for pay was 77% and increased to 85% during the maintenance phase. In the facet of opportunities for promotion, Participant 3 had a job satisfaction measure of 48% and increased to 77% when measured in maintenance. The supervision facet score was 62% at baseline and increased to 92% when measured during the maintenance phase.

Table 3
Results by Percentage for Participant 3

Item	Baseline	Maintenance
Work on present job	55	77
Pay	77	85
Opportunities for promotion	48	77
Supervision	62	92
People on your present job	85	87
Job in general	87	90

The score under people on your present job for Participant 3 was 85% at baseline and increased to 87% during the maintenance phased. The general score of job in general was 87% for Participant 3 at baseline, and it increased to 90% after the intervention in the maintenance phase. The JDI-JIG scale provided a measure of job satisfaction in numerical form with a top score of 54 for each facet. The percentage in this table was determined by measuring the actual score and dividing it by the total possible score to provide a percentage that was applied as level of job satisfaction for the specified facet across two phases of the intervention. The scores indicated the level of job satisfaction the participant had prior to receiving the intervention (i.e., baseline) and after receiving the intervention (i.e., maintenance).

Summary of Results

The results provided evidence to support the use of the Supervisor Training Curriculum: Evidence-Based Ways to Prompt Work Quality and Enjoyment Among Support Staff (Reid et al., 2011) as an intervention package for evidence-based supervision strategies to improve treatment fidelity and job satisfaction for behavior technicians. Participants all reached the established criterion within 1 to 4 sessions and maintained levels at or below criterion across several weeks postintervention. The results of the JDI-JIG showed that all three participants had an increase in job satisfaction from baseline conditions across multiple facets of their job.

Discussion

The purpose of this study was to evaluate the effects of the Supervisor Training Curriculum: Evidence-Based Ways to Promote Work Quality and Enjoyment Among Support Staff (Reid et al., 2011) as a model to be used by a behavior analyst when supervising behavior technicians providing ABA-based services for a child with ASD. The supervision training curriculum developed by Reid et al. (2011) outlined 11 areas of evidence-based practice in supervision. The curriculum provided a structured protocol that can be applied to behavior analysts who are supervising technicians. The curriculum provides a model that offers behavior analysts a way to incorporate evidence-based practices into every supervisory session. The strategies outlined are intended to support the growth and development of the technicians while also promoting enjoyment in their work. Although behavior analysts are often familiar with evidence-based strategies that can be applied within their supervision sessions, the application of strategies can be inconsistent and lack structure. By incorporating a more structured approach, such as that provided in the supervisor training curriculum, behavior analysts can ensure they do not miss important components to supervision.

Typically, the structure, quality, and outcomes of clinical supervision are dependent on the decisions and experience of the supervising behavior analyst. Although they are required to receive training in supervision, this training often focuses on supervision of a trainee with less emphasis on supervision of a supervisee. Consequently, it is common for clinical supervisory skills to be learned on the job, by trial and error, or through self-initiated, but not required, post certificate training. The supervision training curriculum used in this study provided an overview of evidence-based practice in supervision, and competency testing was used as a tool to determine whether a behavior analyst, acting as a clinical supervisor who attended the training, met minimum levels of competency to provide supervision. This tool could be used as a general guide for any behavior analyst who will be acting as a supervisor and may provide a strong foundation for clinical supervisors to use.

The clinical supervisor in this study generalized supervisory practices learned in a 2-day training to his practice. A generalization observation was scheduled following training, and a final competency checklist was completed to assess their implementation of the strategies in a real-world setting. The generalization session showed a 100% accuracy on the competency checklist completed 4 weeks after training. Prior to receiving the 2-day training on supervision, the clinical supervisor reported that they had at least a basic understanding of all areas that were covered in the modules; however, they did not have a strategy to pull each of them together to structure his supervision practices. After receiving training, the supervisor changed their approach to supervision to include evidence-based supervisory strategies across all direct supervision sessions.

The three technicians had an inconsistent latency of the delivery of reinforcement and prompts, as well as exceeded the expected number of missed opportunities to provide a reinforcer or prompt at baseline. The three participants did not meet fidelity at baseline when treatment fidelity was measured. The degree of variability was mixed across all three participants. Treatment fidelity can be measured by analyzing how closely a treatment is implemented to the way it was designed.

The treatment protocols outlined that the latency-to-delivery prompts should be 2-5 s, reinforcement should be delivered within 3 s of the choice response, and there should be no more than three missed opportunities per session. The baseline level for Participant 1 showed that, across two consecutive sessions, the average latency was 24.07 s to deliver a prompt, 14.46 s to deliver reinforcement, and the participant missed an average of seven opportunities. Consequently, Participant 1 had three target areas that required intervention to achieve a higher level of fidelity. Participant 2 had an average latency to prompt of 38.2 s, 8.5 s to reinforce, and 11 missed opportunities at baseline; all three target areas were well beyond achieving fidelity. Participant 3 had an average of 4.1 s, 5.87 s to reinforce and missed opportunities an average of five times at baselined. Participant 3 was close to fidelity prior to the intervention across all three target areas.

Upon receiving a more structured approach to supervision, each of the behavior technicians achieved and maintained improvements in the level of treatment fidelity. Participant 1 made dramatic improvements in reducing the latency for the delivery of prompts and reinforcement as well as reducing missed opportunities within session samples significantly. With the change

to supervision strategies, Participant 1 reduced the average latency to well within that required to meet fidelity benchmarks. The results for Participant 2 were no different, having been previously exposed to the implementation of the teaching protocols; however, there were significantly longer latencies than designed across both prompts and reinforcement at baseline, as well as concerns with missed opportunities. After receiving the intervention, treatment fidelity improved across all three target areas, reducing the latency to well within those outlined in the treatment protocols. Interestingly, Participant 3 was close to meeting fidelity across all three target areas at baseline. Having more experience, 11 years as a behavior technician, implementing similar protocols may have afforded her an advantage. Participant 3 did show improvements and reduced the average latency for both the delivery of prompts and reinforcement as well as missed opportunities to an average of zero before returning to baseline conditions and maintaining that level across at least three session samples. These improvements, although seemingly minor, may make a difference in treatment outcomes. As expected, there were improvements in treatment fidelity with the implementation of an evidence-based structure supervision model.

It was clear, from the findings, that after receiving more structured supervision that consistency incorporated evidence-based strategies there was a positive effect on the level of treatment fidelity. The level of treatment fidelity for all participants showed a range from significant to minor across all participants. Although the researcher assumed there would be some difference between the latency and some missed opportunities, during baseline sessions, participant 1 and participant 2 showed a latency of between 24 seconds to as much as 59 seconds before delivering prompts, with a protocol designed to deliver the prompt within 2 to 5 seconds after the instruction. Not reported in the data, but appearing in the session samples, were repeated deliveries of the Sd before ultimately prompting the choice response. This deviation from the protocol as designed could be potentially detrimental to the overall success of the client. This unexpected finding reinforced the need for an intervention targeted on improving supervision strategies that included focusing on treatment fidelity.

The findings in this study indicated that the quality and type of supervision influenced the level of job satisfaction for technicians. The tool used to analyze job satisfaction; the JDI-JIG is designed to assess the level of job satisfaction across several components of an individual's job. From the research, job satisfaction is highly correlated with an individual's perception of their relationship with their supervision (Eisenberger et al., 2002). The researcher anticipated that, with an improved quality of supervision that incorporated empirically validated strategies, there would be improvements in the satisfaction level. As expected, job satisfaction, as it relates to the clinical supervision, improved across participants. Results indicated a significant change in this area of job satisfaction; at baseline, all three participants' supervision satisfaction levels were around 60%, and, after the intervention, they improved to over 90% satisfaction.

The researcher also expected that there may be improvements in the job satisfaction area of work at the participants' present job. The reason for this expectation was because the participants were asked to consider the specific case assignment when responding to this prompt in the survey. The researcher expected that the participants would be more satisfied with their work on that case assignment if they were implementing procedures with more integrity/fidelity. Research has indicated that, when employees are more competent in their job, they have a high level of satisfaction (Arifin, 2014). Therefore, receiving supervision focused on improving competency was likely to improve satisfaction. The supervision intervention had a strong emphasis on building skills to competency. The technicians had all been exposed to the teaching procedures prior to the intervention; however, previous supervision was not focused on building competency in the same way and reportedly was variable and inconsistent. The participants baseline level of satisfaction for work on present job ranged from 55% to 80% and increased to a range between 77% and 89%.

The technicians receiving the structured and improved quality of supervision not only had improvements to levels of treatment fidelity, but also marked improvements across all facets of job satisfaction assessed. The researcher anticipated that employee satisfaction for the research participants would be high prior to intervention, with the concern that an employee who was willing to volunteer to participate in a study without additional incentives would have a proactive work personality, which is linked to high levels of job satisfaction (Li et al., 2017). Employees with proactive personalities are those individuals who taken initiative, engage in a wide range of activities, and are actively engaged in activities in the workplace (Li et al., 2017). However, the findings were inconsistent with those of Li et al. (2017), as all participants, showing some aspects of proactive personalities and highly engaged workers, showed areas for improvement in job satisfaction. Not surprisingly, Participant 3, who had been employed with the organization the longest, had the highest baseline and postbaseline results. This supports the previous studies that have indicated job satisfaction correlates with an increase in retention (Yarbrough et al., 2017).

In this study, the participants did not have a change in clinical supervision strategies across any of their other case assignments. Therefore, they were receiving the same manner of clinical supervision as they received in the past in all other areas of their work outside of the specific case assignment for the study. One would expect that all other areas may reflect no change in satisfaction level. However, the findings indicated that, by simply changing the supervision methods for one case assignment, there may be improvements across other facets of job satisfaction.

All three technicians had been trained on and implementing the teaching protocol for at least 30 days prior to the baseline phase. It was determined at baseline that they were not implementing the protocols with fidelity. The supervisory strategies the clinical supervisor was using prior to the intervention were producing low levels of fidelity. At the start of the intervention, high rates of fidelity were reached quickly, meeting established criterion within one to four supervision sessions, with results maintaining for several weeks without direct intervention. The clinical supervisors who are supervising in a similar manner may find the results applicable when they are overseeing technicians who have low fidelity in implementation.

Children receiving services may have the potential for improved outcomes from technicians who are receiving structured quality supervision, such as the one used for this study. During the baseline phase, challenging behaviors were exhibited by the client receiving the treatment. Although it was not the purpose of this study, upon the implementation of the intervention, the rates of challenging behavior decreased as the delays in the latency of the delivery of prompts and reinforcement decreased. With the reduction in challenging behavior, there were increased teaching opportunities across session samples. Although speculative, low levels of fidelity may have been contributing to the behaviors displayed by the child during sessions, as it appeared problem behavior decreased over time in the recorded video samples. Higher levels of treatment fidelity have previously been associated with decreases in challenging behaviors (Pinkelman & Horner, 2017).

The results of this study may be valuable to those who provide similar tiered model services such as nurses, teachers, and occupational therapists. The study provides a practical and cost-effective training package as well a strategy to assess job satisfaction across several facets. In the field of ABA, there are high rates of turnover (Novack & Dixon, 2019). The skills gained by the behavior analyst participant in this study proved influential in contributing to better treatment fidelity and job satisfaction. The improvements across all facets of the job satisfaction could indicate that, by making a minor change to supervision quality, job satisfaction can potentially improve globally. Using instruments, such as the JDI-JIG, may help organizations gain a better understanding, monitor, and take actions as they relate to job satisfaction.

Limitations

Prior to the start of the study, the researcher was aware of the risks related to exposure to extended baseline conditions. Due to this limitation, the researcher observed baseline closely across participants to avoid prolonged exposure. It was determined that Participant 1 was a potential risk for this challenge; therefore, baseline was shortened to only two sessions. Decreasing the baseline for Participant 1 could make the results less reliable, as a stable baseline is best achieved by evaluating behaviors from at least three data points and, in this case, ideally three sessions (Kazdin, 2010).

Another potential limitation to the current design was the issue of generality. In the study, participants had similar pre-baseline demographics. The results of this study cannot be assumed as generalizable outside of the specific setting and beyond the specific participants or even beyond what was achieved on the specific case assignment. As with all single-subject research, generalization to a larger population can only be shown with future replication studies, where manipulations of the subjects and settings can be made. Another limitation to study was related to irreversibility. The newly acquired skills of supervision could not be removed from the supervising behavior analyst who was instructed to stagger the intervention across the three technicians; therefore, it is not possible to know if the clinical supervisor inadvertently began some portions of the intervention with one or more of the participants prior to the onset of the intervention. In addition, the researcher focused on only a few areas associated with treatment fidelity (i.e., latency of delivery of prompts and reinforcement). This is a limitation to the findings of the study; further studies should investigate additional areas of treatment fidelity to examine if similar results are established.

Although the results of this study are promising, there are limitations related to generalization. The results are specific to the participants and their learning histories, as well as the specific case assignment and the target behaviors evaluated. It is not clear if the same results would be found with other participants, across other target behaviors, with a difficult case assignment. Additionally, these results can only be applied to the specific service model and practices of the ABA agency used as the research site. It is not possible to know if these results could be generalized across other ABA service provider agencies without future research. Furthermore, while there was an increase in job satisfaction across participants practice effects

could occur because of the participants previous exposure the JDI-JIG.

Future Research Directions

Turnover is a problem in the field of ABA. Research has shown job satisfaction as an important factor in reducing turnover (Abbasi & Hollman, 2000; Ezeh & Olawale, 2017; Kuo et al., 2014). The results related to the employee job satisfaction were favorable in this study, and future research directions could focus on long-term gains of job satisfaction, or the factors related to turnover of behavior technicians. Future research could expand on the number of supervisors using the supervision curriculum (Reid et al., 2011) across a diverse pool of technicians. Additionally, an extension to this study could focus on broadening the setting of the intervention assessing whether the intervention could be generalized across other settings and other types of providers.

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