Increasing Staff Healthy Behavioral Practices in Programs for Adults with Intellectual and Developmental Disabilities

By
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Abstract

Problem behavior is common in adults with intellectual and developmental disabilities (IDD; Lowe et al., 2007). Some research has suggested that movement from institutions to community-based programs has resulted in challenges to service provision for these individuals, specifically with respect to managing problem behavior (Beadle-Brown, Mansell, & Kozma, 2007). Decades of research on training staff to provide active treatment (e.g., Parsons, Rollyson, & Reid, 2004) has suggested (a) its importance for decreasing problem behavior and increasing appropriate behavior and (b) the efficacy of empirically derived organizational behavior management procedures (e.g., behavioral skills training [BST; Parsons, Rollyson, & Reid, 2012] and on-the-job feedback [Van OOrsouw, Embregts, Bosman, & Jahoda, 2009]) for increasing important staff behaviors in programs for adults with IDD. Regardless, organizations continue to have challenges in training staff and ensuring staff compliance with these and other important skills (Harchik & Campbell, 1998). Furthermore, even though decades of research on functional behavior assessment (FBA) and function-based intervention suggest effective procedures for decreasing problem behavior (Hagopian, Dozier, Rooker, & Jones, 2013), the individualized approach of this process has its challenges. Recently, discussion papers (e.g., Ala'i-Rosales et al., 2018) and a few research studies (e.g., St. Peter & Marsteller, 2017) have suggested the potential utility of using FBA and function-based intervention literature to derive preventive approaches as a Tier I model for preventing and decreasing problem behavior. Therefore, the purpose of the current study was to create a prevention approach in which we took what is known about common functions of problem behavior and effective function-based interventions to create four healthy behavioral practices to train staff. Then, we used BST and on-the job feedback to increase staff implementation of these practices across a large number of staff and

programs in a large community-based organization serving adults with IDD. Namely, we trained staff to provide frequent positive interactions, effective instructions, correct responses to problem behavior, and to promote consumer engagement with items and activities.

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Increasing Staff Healthy Behavioral Practices in Programs for Adults with Intellectual and Developmental Disabilities

Problem behavior is common in adults with intellectual and developmental disabilities (IDD; Emerson et al., 2001; Lowe et al., 2007; McClintock, Hall, & Oliver, 2003) and poses various challenges to the individuals, their caregivers, and society. Thus, a major focus in effective behavioral support for individuals with IDD involves decreasing the occurrence of problem behavior and increasing appropriate behavior (Rotholz, Moseley, & Carlson, 2013). The deinstitutionalization movement resulted in relocation of many adults with IDD from institutions (i.e., congregate care) to community-based home and day programs (Bouras & Jacobson, 2002) and has been associated with an increase in quality of life (e.g., more opportunities for choice, community participation, and acquisition of new skills). Additionally, this movement resulted in better care for some individuals (Chowdhury & Benson, 2011; Shipton & Lashewicz, 2017), particularly those in small community-based settings (Burke, Lulinksi, Jones, & Gallus, 2018). However, some research suggests this movement is not associated with other important outcomes such as decreases in problem behavior. In fact, research has suggested that some adults with IDD may show an increase in the occurrence of problem behavior in community placements (Beadle-Brown et al., 2007; Kozma, Mansell, & Beadle-Brown, 2009). Some limitations of the current state of community-based services include moving some individuals with IDD to community-based programs without a clear plan for addressing their complex needs (e.g., knowledge of the situations that evoke and maintain problem behavior and knowledge of effective interventions for problem behavior) and failing to provide them with needed behavioral support and supervision to ensure these needs are met. Furthermore, research suggests community placements for individuals with IDD who engage in problem behavior have

been associated with a large increase in the prescription of psychotropic medications regardless of the lack of support for their efficacy (Kozma et al., 2009).

Federal regulations require that programs for adults with IDD provide active treatment, which refers to "a continuous, aggressive, and consistent implementation of a program of specialized and generic training, treatment, and health or related services, directed toward helping the enrollee function with as much self-determination and independence as possible" (Code of Federal Regulations, 2011; Medicaid, 2019). However, both federal and state regulations on active treatment do not clarify the specific types of services that constitute active treatment that are required in these settings. Regardless, researchers have attempted to define some specific staff behaviors that may constitute active treatment for adults with IDD (e.g., Parsons, Cash, & Reid, 1989; Parsons & Reid, 1993). Parsons et al. (1989) evaluated the state of programs for adults with IDD and sought to increase active treatment in several institutional units that served adults with IDD. The authors of this study defined active treatment as consumers being engaged with leisure activities or with habilitative tasks (e.g., appropriately manipulating item in manner intended; combing hair), interacting with staff, or receiving help from staff. The authors further categorized active treatment into leisure, self-help, social, and community skill categories, suggesting that active treatment includes services that teach or improve consumer skills in any one of these categories.

Early and more contemporary studies have focused on various aspects of staff behavior within the active treatment framework including staff positive interactions and rapport building, choice provision, delivery of effective instructions (e.g., use of prompts), and promotion of appropriate consumer engagement in activities (Cooper & Browder, 2001; Fleming & Sulzer-Azaroff, 1992; Jones et al., 1999; McLaughlin & Carr, 2005; Parsons et al., 1989; Parsons et al.,

2004; Realon, Bligen, Laforce, Helsel, & Goldman, 2002; Reid, Parsons, & Green, 2001; Repp, Barton, & Brulle, 1981; Weinberg, Parenti, & Powell, 2000). However, several researchers have reported the lack of active treatment in various environments serving adults with IDD (Chan & Yau, 2002; Felce & Emerson, 2001; Parsons et al., 1989; Parsons et al., 2004; Reid et al., 2001; Repp et al., 1981; Sturmey, 1995). For example, with respect to positive interactions, Chan & Yau (2002) found that interactions between staff and consumers were absent in approximately 62% of intervals during observations, and most of the interactions provided were centered around custodial or health care. The lack of active treatment found in these environments is associated with the occurrence of increased levels of problem behavior (Felce & Emerson, 2001; Manente, Maraventano, LaRue, Delmonlino, & Sloan, 2010; Zoder-Martell et al., 2014). Decades of research, albeit mostly in institutional settings (Harchik & Campbell, 1998; Wood, Luiselli, & Harchik, 2007), clarified ways to improve staff provision of various aspects of active treatment using best-practice staff training methods in the organizational and behavior management literature (e.g., Behavioral skills training [BST] and on-the-job support and feedback; Harchik & Campbell, 1998; Harchik, Sherman, Sheldon, & Strouse, 1992; Parsons et al., 1989; Reid, O'Kane, & Macurik, 2011; Van OOrsouw et al., 2009). However, the focus of these studies has been on improving one or two aspects of active treatment (e.g., promoting positive interactions and increasing consumer engagement). Thus, research that systematically addresses multiple staff behaviors for increasing active treatment is warranted. Furthermore, despite research outcomes showing the efficacy of training staff to increase active treatment in these environments, focus and training on these and other skills continue to be a challenge in programs for individuals with IDD (DiGennaro Reed & Henley, 2015; Reid, 2004).

There are a several reasons why the provision of active treatment in programs for adults with IDD has such challenges, particularly in the age of community-based services. Some of these reasons include lack of qualified or well-trained staff (including direct-care staff and professionals with expertise in conducting functional behavioral assessments [FBAs], implementing function-based interventions, and using effective staff training methods; Cox, Dube, & Temple, 2015; Hewitt & Larson, 2007; Rotholz et al., 2013; Wood et al., 2007), high staff turnover and staffing shortages (Hewitt & Larson, 2007), lack of funding for adult services (e.g., Bottos, Feliciangeli, Sciuto, Gericke, & Vianello, 2001), and lack of clear federal regulations and guidelines for behavior support practices (Anderson, Dabelko, & Tarrant, 2012; Rotholz et al., 2013). Furthermore, with respect to community-based services, direct-care staff typically work in various locations in the community (i.e., dispersed locations), which influences supervision and feedback regarding the integrity with which they are providing services. Additionally, staff have increased responsibilities (as compared to institutional environments) which not only include basic care, training, and provision of health and safety, but also includes ensuring individuals with IDD obtain employment, make friends, achieve personal goals, and are integrated into society (Hewitt & Larson, 2007). This community-based arrangement, in conjunction with the focus on individualized service provision as mandated by some funding sources, is associated with economic challenges as well as challenges to ensuring high-quality professional support for the direct-care staff in these environments (Harchik & Campbell, 1998).

In addition to the lack of active treatment in some community-based environments, little current and systematic research involving FBA and function-based interventions for adults with IDD in *community-based environments* has been conducted (Manente et al., 2010). However, decades of research have been conducted with both children and adults with IDD showing that

common functional variables maintain problem behavior in individuals with IDD and that function-based interventions are effective for decreasing the occurrence of problem behavior in this population (Beavers, Iwata, & Lerman, 2013; Hanley, Iwata, & McCord, 2003). This process has underscored the utility of an individualized approach to assess and treat problem behavior, which is the gold standard in behavior analysis (Hanley et al., 2003). However, given some of the contextual variables associated with service provision for adults with IDD in community-based programs (e.g., staff serving numerous clients in dispersed locations without adequate training and supervision; staff working in multiple homes and programs within an agency; high staff turnover; lack of funding for service provision), training staff on a more proactive approach for preventing and managing problem behavior in programs for adults with IDD is imperative. Thus, applying knowledge of common functions and function-based interventions to prevent and respond to problem behavior by individuals with IDD in community-based settings may be particularly important.

In the current paper, we first provide an overview of the literature that was integral for determining staff interactions that may be associated with the occurrence of problem behavior and appropriate behavior and for which we could derive practices to train staff. Thus, the initial part of this paper includes (a) a brief discussion of problem behavior in individuals with IDD and the challenges it poses to the individual, caregivers, and society; (b) an overview of common functions of problem behavior; (c) a description of function-based interventions that have been shown to be effective for decreasing problem behavior; and (d) a discussion regarding the use of technologies derived from the literature on common functions of problem behavior and function-based interventions for deriving preventive approaches for problem behavior. This information is followed by a description of a large-scale evaluation of an empirically derived prevention

approach that involved training staff on four important skills in working with adults with IDD in community-based programs.

Problem Behavior in IDD

Individuals with IDD and related disabilities (e.g., autism spectrum disorder) sometimes engage in severe problem behavior such as self-injurious behavior (SIB; e.g., biting self), physical aggression (e.g., hitting others), property destruction (e.g., throwing, ripping up, or breaking objects), pica (i.e., ingestion of inedible items), and elopement (i.e., running away from areas of supervision; Condillac, 2007; Emerson, 2000). Individuals with IDD may also engage in less severe problem behavior such as noncompliance (i.e., failure to follow instructions), tantrums, and stereotypy (i.e., repetitive behavior; Condillac, 2007).

Recent prevalence rates of problem behavior in individuals with IDD and related disabilities suggest 5 - 10% engage in severe problem behavior; however, these levels increase to approximately 50% when less severe problem behavior is considered (Condillac, 2007; Lowe et al., 2007). Although limited, some researchers have evaluated the levels of problem behavior specifically among *adults* with IDD and related disabilities and reported that 2 - 40% engage in physical aggression or property destruction, up to 19% engage in stereotypy, up to 10% engage in SIB, and 11 - 40% engage in various forms of disruptive behavior (Antonacci, Manuel, & Davis, 2008; Matson & Rivet, 2008).

The occurrence of problem behavior in adults with IDD poses several challenges to the individual, their caregivers, and society. An obvious concern is the risk of harm to self that may cause tissue damage, other medical concerns, and even death (Hyman, Fisher, Mercugliano, & Caltado, 1990; Kahng, Iwata, & Lewin, 2002; Nissen & Haveman, 1997). However, other challenges associated with problem behavior include interference with acquisition of important

skills and participation in community social and therapeutic activities, which may impact one's quality of life (Hagopian et al., 2013; National Institutes of Health, 2001). Furthermore, the occurrence of problem behavior is associated with restrictive procedures such as physical, mechanical, and chemical restraints, which are associated with various side effects (Lowe et al., 2007; Matson & Boisjoli, 2009). Problem behavior is also associated with various challenges to caregivers such as family members and direct-care staff. These challenges include physical harm and destruction of property, which are associated with potential medical concerns, increased financial costs, as well as caregiver stress related to the necessity of providing constant supervision and intervention (Hagopian et al., 2013; Kahng et al., 2002; Lloyd & Kennedy, 2014; Luiselli, 2012; Taylor, Oliver, & Murphy, 2011). Thus, staff providing services to these individuals may be more likely to deliver poor services and abuse consumers (Singh, Lancioni, Karazsia, & Myers, 2016). Similarly, programs for individuals with problem behavior experience high staff turnover, which also interferes with quality service provision (Antonacci et al., 2008). Finally, problem behavior is associated with challenges for society, mainly in the form of a need for services and supports. For example, annual costs for treating an individual with IDD may exceed $3.2 million in the United States alone (Ganz, 2007), and the lifetime excess costs to society for the 2000 birth cohort of individuals with IDD is approximately $44 billion (Honeycutt et al., 2003). Furthermore, the life expectancy improvements for individuals with IDD (Bouras & Jacobson, 2002) will likely increase these costs (Bittles et al., 2002).

In summary, problem behavior displayed by individuals with IDD is a concern regarding quality of life for the individual and presents challenges to individuals' family members, their staff, and society. Decades of research has been conducted to determine why individuals with IDD engage in problem behavior and to identify effective ways for treating and managing

problem behavior. Thus, ongoing and continued research in this area is fundamental to ensure ongoing and continued support for adults with IDD and to ensure improvements in quality of life (New Freedom Commission on Mental Health, 2003).

Functions of Problem Behavior

Much like appropriate behavior, most problem behavior is learned through contingencies in the environment and is maintained by common functions (Iwata, Kahng, Wallace, & Lindberg, 2000). In fact, hundreds of studies have suggested some common variables may function to increase and maintain the occurrence of problem behavior including (a) social positive reinforcement in the form of access to attention from others (e.g., reprimands, lectures) or access to preferred items or activities (e.g., access to playing video games), (b) social negative reinforcement in the form of escape or avoidance of aversive situations (e.g., self-help tasks, academic demands, medical routines), (c) automatic positive reinforcement in the form of access to sensory stimulation (e.g., visual or auditory stimulation), and (e) automatic negative reinforcement in the form of escape or avoidance of aversive stimulation (i.e., pain attenuation; McComas & Mace, 2000; Mueller & Nkosi, 2006; Neidert, Rooker, Bayles, & Miller, 2013).

Most of the research showing the influence of various environmental events on the occurrence of problem behavior has involved the use of FBA methodology (Hagopian et al., 2013; Hanley, 2012; Iwata & Dozier, 2008). This methodology involves various procedures including indirect assessments such as caregiver interviews (Kelley, LaRue, Roane, & Gadaire, 2011), descriptive assessments such as ABC data (Thompson & Borrero, 2011), and functional (i.e., experimental) analyses (Betz & Fisher, 2011). FBAs allow clinicians and researchers to identify the antecedents and consequences hypothesized to maintain the occurrence of problem behavior. Determination of these controlling environmental events allows for the development

of interventions tailored to these maintaining variables and that are likely to reduce the occurrence of the problem behavior.

As outlined by Iwata et al. (2000), FBA methodology has three distinct goals. The first is to determine the antecedents and consequences associated with the occurrence of problem behavior displayed by an individual, and to learn about the environmental conditions that evoke and maintain the occurrence of problem behavior. The second is to provide a basis for deriving treatments that are likely to be effective in reducing the occurrence of problem behavior. The third is to potentially provide information that lays the groundwork for creating environments that may prevent the occurrence and shaping of problem behavior. For example, the information gained from decades of research on the environmental events likely to evoke and maintain the occurrence of problem behavior may inform changes to environments to effectively prevent problem behavior.

Although various FBA methods have been used to determine antecedent and consequence events that are likely to maintain the occurrence of problem behavior, the only methodology that allows for determination of a cause-effect relation between these events and problem behavior is functional analysis (FA) methodology (Iwata, Dorsey, Slifer, Bauman, & Richman, 1982/1994). This approach involves direct observation of target problem behavior while manipulating the occurrence of specific antecedent and consequent events to determine their influence on target problem behavior. Specifically, FAs involve one or more test conditions and a control condition that are conducted in brief sessions (e.g., 5 or 10 min) until clear patterns emerge (Iwata & Dozier, 2008). During the test conditions, (a) establishing operations are programmed to influence the value of the programmed reinforcer for problem behavior, (b) discriminative stimuli are programmed to signal the availability of the programmed reinforcer,

and (c) problem behavior results in the reinforcer programmed for that condition (Neidert et al., 2013). During the control condition, these programmed events are not present. If higher levels of problem behavior are observed in a test condition(s) as compared to the control condition, then this suggests the functional variable for that behavior (i.e., the conditions maintaining the occurrence of the problem behavior; Hanley et al., 2003; Neidert et al., 2013).

Beginning with the seminal study by Iwata and colleagues (1982/1994), FA methodology has included tests for various hypothesized functional variables (see Beavers et al., 2013 and Hanley et al., 2003 for a detailed discussion); however, there are several conditions that are often conducted to test for common functional variables (i.e., social positive reinforcement in the form of attention or tangibles, social negative reinforcement in the form of escape from aversive contexts, and automatic reinforcement). Specific antecedents and consequences are manipulated for these functions. The attention condition is designed to test for the influence of social positive reinforcement in the form of access to attention. In this condition, the antecedent involves deprivation from attention (i.e., the therapist ignores the client) and the consequence for problem behavior is brief delivery of attention (e.g., reprimand). The tangible condition is designed to test for the influence of social positive reinforcement in the form of access to preferred items and activities. In this condition, the antecedent involves restricting access to high preferred items or activities and the consequence for problem behavior is brief access to those items/activities. The escape condition is designed to test for the influence of social negative reinforcement in the form of escape or avoidance of particular aversive contexts (e.g., academic demands, self-care tasks). In this condition, the antecedent involves presenting the aversive context (e.g., demand or task) and the consequence for problem behavior is brief access to escape from the aversive context. The alone or no interaction condition is designed to determine whether problem behavior persists

in the absence of social consequences (i.e., is maintained by automatic reinforcement), thus suggesting the behavior itself produces the reinforcer (Vaughn & Michael, 1982). In this condition, the antecedent is lack of stimulation in which the individual is placed in a barren environment and no programmed consequences are delivered for the occurrence of problem behavior.

Since the publication of Iwata et al. (1982/1994), FA methodology has become the dominant approach for determining the variables maintaining the occurrence of problem behavior. That is, hundreds of research studies have shown the utility of this methodology for determining the function of problem behavior for various problem behaviors, IDD populations, and across various settings (see Beavers et al., 2013 and Hanley et al., 2003 for a detailed review of FA methodology). In addition, descriptive analysis research suggests the ecological validity of FA methodology in that the variables manipulated in FAs have been observed to occur in the natural environment (e.g., Camp, Iwata, Hammond, & Bloom, 2009; Thompson & Iwata, 2001). Furthermore, decades of research studies have been conducted to derive various methodological extensions of FA methodology that allow for safer, quicker, and less resource intensive FAs (Beavers et al., 2013; Hagopian et al., 2013; Hanley, 2012). Finally, FAs have allowed clinicians and researchers to derive function-based interventions that allow for directly addressing the functional variables, thus providing more effective and socially valid interventions (Newcomer & Lewis, 2004; Hanley, 2011, 2012).

Function-Based Interventions

Function-based interventions are those that are based on the variables maintaining the occurrence of problem behavior. The results of decades of research have suggested the utility of various environmental manipulations for reducing the occurrence of problem behavior. As has

been outlined by various authors (e.g., Fisher & Bouxsein, 2011; Iwata et al., 2000; Iwata & Dozier, 2008), there are three fundamental ways in which problem behavior may be reduced that take the function of problem behavior into consideration. First, the antecedent event that evokes problem behavior may be modified to decrease the motivation to engage in the problem behavior (e.g., noncontingent reinforcement; NCR). Second, the reinforcer maintaining the problem behavior can be eliminated (extinction; EXT). Keep in mind that it is recommended that EXT not be implemented alone; best practice involves combining EXT with some reinforcement-based intervention. Third, the functional reinforcer may be provided for an appropriate replacement behavior or the absence of problem behavior (differential reinforcement). The interventions in these categories are procedurally different depending on the function of the problem behavior. Below, we provide an overview of various interventions in these categories; however, we refer the reader to Fisher and Bouxsein (2011) and Hagopian et al. (2013) for detailed discussions of function-based interventions for problem behavior.

Antecedent Interventions

Noncontingent reinforcement. Antecedent interventions involve modifying the environment to influence establishing operations (EOs; Laraway, Snycerski, Michael, & Poling, 2003) for problem behavior. That is, these interventions involve manipulating EOs to decrease the value of the functional reinforcer, which in turn reduces the motivation to engage in problem behavior to access that reinforcer (abolishing operation [AO]). A common function-based antecedent intervention is noncontingent reinforcement (NCR; Carr et al., 2000; Phillips, Iannaccone, Rooker, & Hagopian, 2017), which involves the delivery of reinforcers on a response-independent schedule. Reinforcers used in NCR can be functional (i.e., reinforcers maintaining problem behavior) or nonfunctional (i.e., arbitrary but high preferred stimuli that

may substitute for or compete with the occurrence of the problem behavior; e.g., Hagopian, Crockett, Van-Stone, DeLeon, & Bowman, 2000; Lindberg, Iwata, Roscoe, Worsdell, & Hanley, 2003). Furthermore, treatment with NCR typically involves an initial dense schedule of reinforcement delivery (i.e., a continuous schedule) that later may be systematically thinned such that sustained implementation is feasible. In fact, research has suggested that dense schedules of NCR may initially be effective by decreasing the EO for engaging in problem behavior, whereas over time, once the schedule is thinned, effects are maintained due to EXT (i.e., interruption of the response-reinforcer contingency; Kahng, Iwata, Thompson, & Hanley, 2000).

The establishing operation for problem behavior maintained by social positive reinforcement (e.g., attention or tangibles) is deprivation from or restricted access to those reinforcers. Thus, NCR for problem behavior maintained by these functional variables involves delivering the functional reinforcer on a response-independent, or time-based schedule (e.g., Hagopian, Fisher, & Legacy, 1994; Kahng, Iwata, DeLeon, Wallace, 2000; Mace & Lalli, 1991; Marcus & Vollmer, 1996; Van Camp, Lerman, Kelley, Contrucci, & Vorndran, 2000). For example, Kahng et al. (2000) used NCR to treat problem behavior maintained by social positive reinforcement (i.e., attention or tangibles) of three adults with IDD. In the NCR procedure, the functional reinforcers were delivered on an initially dense fixed-time schedule that was systematically thinned over time. Results showed that NCR resulted in near-zero levels of all participants' problem behavior, even after the schedule of reinforcement was thinned (e.g., from 6 s to 5 min). These results are consistent with numerous other studies that have shown reductions in problem behavior maintained by social positive reinforcement using NCR (e.g., Lancaster et al., 2004).

In addition to providing attention during NCR for treatment of problem behavior maintained by attention, some studies have suggested the utility of providing high preferred items or activities that may compete with the occurrence of attention-maintained problem behavior (e.g., Fisher, DeLeon, Rodriguez-Catter, & Keeney, 2004; Fisher, O'Connor, Kurtz, DeLeon, & Gotjen, 2000; Hanley, Piazza, & Fisher, 1997). For example, Fisher et al. (2000) first conducted an FA to show that an adolescent male engaged in problem behavior maintained by attention. Next, they conducted a competing-items assessment (Piazza et al., 1998) to determine items that were associated with high levels of engagement and low levels of problem behavior (i.e., those that competed with the occurrence of attention-maintained problem behavior). Finally, they provided noncontingent access to these high-preferred items during situations in which the participant did not have access to attention. Results showed low levels of problem behavior and high levels of engagement during NCR with access to high-preferred items, even when problem behavior continued to result in attention (i.e., EXT not implemented). A clear benefit of delivering high-preferred items to treat problem behavior maintained by attention is that during times in which the delivery of attention is not feasible for caregivers (i.e., when they are busy interacting with others or completing other tasks), access to preferred items and activities might bridge the gap between attention deliveries (Fisher et al., 2000; Fisher et al., 2004).

The establishing operation for problem behavior maintained by escape is the presence of an aversive context (e.g., task demands). Thus, NCR for problem behavior maintained by escape involves decreasing the aversiveness of the context, thereby decreasing the motivation for escape. One such procedure involves providing escape on a time-based schedule such that the individual can access a break from the aversive context regardless of the occurrence of problem

behavior (e.g., Allen & Wallace, 2013; Vollmer, Marcus, & Ringdahl, 1995). For example, in a randomized controlled trial with 151 children, Allen and Wallace (2013) showed that noncontingent escape from dental treatment was found to reduce not only the occurrence of problem behavior, but also the necessity of restraint for children ages 2 - 9 who were in the treatment group compared to the control group, which received "usual behavior management" techniques.

Another NCR procedure for escape-maintained problem behavior involves providing free access to preferred stimuli (e.g., preferred items or interactions) during the aversive context in an attempt to decrease the motivation to escape that context (i.e., to make the context more preferred; Lalli et al., 1999; Lomas, Fisher, & Kelley, 2010; Long, Hagopian, DeLeon, Marhefka, & Resau, 2005). For example, Lomas et al. (2010) showed the delivery of preferred edibles and attention on a variable time (VT) 10-s schedule during a demand context was effective for decreasing escape-maintained problem behavior in three boys with IDD even when problem behavior continued to result in escape (see Payne & Dozier, 2013 for a brief review on the use of positive reinforcement in treatment of escape-maintained problem behavior).

Given that the EO for problem behavior maintained by automatic positive reinforcement is assumed to be deprivation from either a specific form of sensory stimulation or all stimulation, removal of this deprivation should result in a decrease in problem behavior. Therefore, NCR for treating problem behavior maintained by automatic positive reinforcement typically involves providing free and continuous access to stimuli that are likely to substitute for or compete with the sensory reinforcement produced by engaging in the problem behavior (Favell, McGimsey, & Schell, 1982; Gover, Fahmie, & McKeown, 2019; Piazza, Adelinis, Hanley, Goh, & Delia, 2000). Earlier research on this type of procedure (i.e., environmental enrichment [EE]; Horner,

1980) suggested that providing continuous access to toys or leisure items reduces rates of problem behavior. However, most recently, NCR has involved empirically determining high-preferred items and activities in an attempt to substitute or compete with the occurrence of problem behavior maintained by automatic positive reinforcement. That is, prior to implementing NCR for the reduction of problem behavior maintained by automatic reinforcement, researchers and clinicians typically conduct a preference assessment (e.g., DeLeon & Iwata, 1996; Fisher et al., 1992) to determine high-preferred items or activities, or better yet, use the results of the preference assessment to then conduct a competing-items assessment (e.g., Piazza et al., 1998; Piazza, Fisher, Hanley, Hilker, & Derby, 1996; Zhou, Goff, & Iwata, 2000) to determine items and activities likely to compete with the occurrence of problem behavior. During competing-items assessments, brief sessions are conducted to determine items that result in high levels of engagement and low levels of problem behavior that can be used during NCR. Although NCR procedures to decrease the occurrence of automatically reinforced problem behavior have resulted in reductions of problem behavior, recent reviews suggest that for some individuals, it may be more effective to combine this with additional procedures such as prompts and reinforcement for engagement with these items, and with consequence manipulations for the occurrence of problem behavior (e.g., reprimands and response interruption; DiGennaro Reed, Hirst, & Hyman, 2012; Gover et al., 2019).

Overall, research has shown that NCR is an effective intervention for reducing problem behavior maintained by various common functions. Furthermore, research has provided information regarding the benefits of NCR, potential limitations of NCR, as well as best practice suggestions for its implementation. The benefits of NCR include (a) ease of implementation, (b) high rates of reinforcement, and (c) a reduction of the likelihood of extinction-induced side

effects (Tucker, Sigafoos, & Bushell, 1998; Vollmer et al., 1998). However, there are few limitations and considerations associated with NCR. First, NCR may result in adventitious reinforcement because the delivery of reinforcement is response-independent; however, research has suggested that this may be mitigated by including an omission contingency in which the occurrence of problem behavior delays reinforcement delivery (e.g., Britton, Carr, Kellum, Dozier, & Weil, 2000; Lalli, Mace, Livezey, & Kates, 1998). Second, NCR does not program for the increase of specific replacement behaviors such that the individual learns appropriate behaviors to access the functional reinforcer; however, research has suggested that NCR could be combined with procedures to teach these replacement behaviors given that it does not seem to interfere with the acquisition of these behaviors, particularly as the NCR schedule is thinned (e.g., Goh, Iwata, & DeLeon, 2000; Marcus & Vollmer, 1996). Third, NCR may be impractical under dense reinforcement schedules (e.g., continuous attention delivery), thus underscoring the importance of schedule thinning in relevant situations (see Carr & LeBlanc, 2006, Carr et al., 2000, and Tucker et al., 1998 for detailed literature reviews on using NCR procedures for reducing problem behavior).

Additional antecedent interventions. Other antecedent interventions have been found to be effective, in addition to NCR, for treatment of problem behavior maintained by social-negative reinforcement. These interventions involve other ways to decrease the motivation to escape aversive situations, particularly demand situations, by (a) reducing the number of demands presented (i.e., demand fading), (b) reducing the effort to complete the task, or (c) reducing the overall aversive aspect of the demand context (Geiger, Carr, & LeBlanc, 2010; Smith & Iwata, 1997). Demand (or instructional) fading involves initially removing all demands presented (or decreasing the number of demands) then slowly increasing the number of demands

over time (e.g., Butler & Luiselli, 2007; Pace, Iwata, Cowdery, Andree, & McIntyre, 1993; Piazza, Moes, & Fisher, 1996; Zarcone et al., 1993; Zarcone, Iwata, Smith, Mazaleski, & Lerman, 1994). Similarly, demand fading may involve gradually teaching tolerance of demands or other aversive situations through the process of gradually reintroducing the amount or duration of demands over time (e.g., Pace et al., 1993). Demand fading is most likely to be effective when combined with EXT or other consequence procedures (Zarcone et al., 1994). Furthermore, demand fading has been suggested for use with individuals who engage in high levels of problem behavior or severe problem behavior in demand contexts. An example of the efficacy of demand fading was shown by Zarcone et al. (1994) who treated the escape-maintained problem behavior (i.e., SIB) of three adults with IDD. The experimenters implemented demand fading (instructional fading) and EXT by initially withdrawing all demands until zero levels of SIB were established. Next, the experimenters systematically increased the number of demands presented (i.e., increased the demand by one if the participants' rate of problem behavior occurred at or below a predetermined criterion). Results showed near-zero levels of SIB, even when the number of demands gradually increased from zero to two instructions per minute (or 30 instructions per session) for all participants.

Procedures used to reduce the effort of the task include prompting procedures (e.g., errorless learning procedures, modeling, gestural, or physical prompts), which increase the likelihood of correct responding (e.g., Ebanks & Fisher, 2003; McComas, Hoch, Paone, & El-Roy, 2000). Errorless learning procedures allow the individual to be provided with prompts immediately following an instruction (antecedent prompts) to increase the likelihood of correct responding, and thus, access to reinforcement. For example, Ebanks and Fisher (2003) compared the levels of problem behavior of a 19-year old male with IDD when prompts were

provided following incorrect responding (consequence feedback) and when they were provided immediately prior to the opportunity to respond (errorless learning) during a matching task. Results showed high levels of problem behavior in the consequent feedback condition and zero levels of problem behavior in the errorless learning condition.

In addition to the procedures discussed above, various other interventions have been used to decrease the overall aversiveness of demand contexts to reduce the occurrence of escape-maintained problem behavior. One procedure involves interspersing easy (or preferred) demands with difficult (or less preferred) demands (e.g., Davis, Brady, Williams, & Hamilton, 1992; Horner, Day, Sprague, O'Brien, & Heathfield, 1991; Mace et al., 1988) or presenting demands within preferred contexts such a play periods (Carr, Newsom, & Binkoff, 1976; Lalli et al., 1999; Pace, Ivancic, & Jefferson, 1994). Researchers have suggested that the utility of this procedure may be due to several variables including (a) increased reinforcement with the inclusion of easy demands, (b) increased stimulus variety with the inclusion of various demands, and (c) the inclusion of EXT. Regardless of the mechanism, and as is the case with many other antecedent interventions, research has suggested this procedure is most effective when implemented with EXT (Pace et al., 1993; Zarcone et al., 1993).

A final procedure for reducing the aversiveness of the demand context involves making direct changes to the instructions. First, the individual may be provided with a choice of which task to perform (e.g., Berkman & Meyer, 1988; Dunlap et al., 1994; Dyer, Dunlap, & Winterling, 1990) or the order in which to perform various tasks (e.g., Kern, Mantegna, Vorndran, Bailin, & Hilt, 2001; McComas, et al., 2000; Tasky, Rudrud, Schulze, & Rapp, 2008). For example, Tasky et al. (2008) treated the off-task behavior of three women with traumatic brain injuries using choice for the order of completing daily home tasks such as making the bed, vacuuming,

exercising, and doing the laundry. More specifically, treatment involved providing the participants with a list of nine tasks and asking them to complete any three tasks from the list. Results showed increased on-task behavior in the choice condition compared to the no-choice condition, in which the experimenter provided participants with three tasks and instructed them on the order in which to complete the tasks. Researchers have suggested that activity choice may result in reductions in problem behavior because the individual may choose the activity they prefer, or because choosing is itself reinforcing (see Romanuik & Miltenberger, 2001 and Kern et al., 1998 for further discussion on choice interventions to reduce problem behavior).

Second, instructional revision can be used to modify some aspects of the curriculum that may make the demand context aversive (Geiger et al. 2010). For example, one modification may be to simplify instructions by breaking tasks into small, manageable steps (task analysis; Cooper, Heron, and Heward, 2007). Furthermore, some researchers have suggested that instructing individuals on what they should "do" rather than what they should "not do" may influence problem behavior (e.g., Adelinis & Hagopian, 1999; Neef, Shafer, Egel, Catoldo, & Parrish, 1983). For example, Adelinis and Hagopian (1999) conducted an FA with an adult with IDD who engaged in physical aggression in demand contexts. The FA involved comparing the effects of "do" and "don't" requests with the participant, who often engaged in inappropriate behaviors in his residence such as pica, laying on the floor, and touching others inappropriately. If the participant was laying on the floor, the "do" request would involve an incompatible behavior such as "Stand up," whereas the "don't" request would involve a request such as "don't lay on the floor." FA results showed very low to near zero levels of problem behavior following "do" requests and high levels of problem behavior following "don't" requests. Thus, to reduce problem behavior for this participant, instructions would need to be delivered as "do" rather than

"don't" requests, an antecedent intervention that may reduce the occurrence of problem behavior. The implication of this study is that "don't" requests may be more likely to signal the disruption of reinforcing activities than "do" requests, hence potentially resulting in higher levels of problem behavior.

Extinction

Extinction involves withholding a functional reinforcer for the occurrence of problem behavior (Iwata, Pace, Cowdery, & Miltenberger, 1994). Although few studies have shown the efficacy of EXT alone, researchers have suggested EXT should not be used in isolation due to various potential side effects such as EXT bursts (Lerman, Iwata, & Wallace, 1999) and increased emotional responding (Cowdery, Iwata, & Pace, 1990). Studies have suggested the efficacy of EXT when used in conjunction with reinforcement-based procedures such as NCR and differential reinforcement procedures (e.g., Hagopian, Fisher, Sullivan, Acquisto, & LeBlanc, 1998; Zarcone, Iwata, Hughes, & Vollmer, 1993). EXT is procedurally different depending on the functional variable maintaining the problem behavior (Iwata, Pace, Cowdery, & Miltenberger, 1994). For problem behavior maintained by social positive reinforcement in the form of attention or access to tangibles, EXT involves withholding attention or tangibles following the occurrence of problem behavior (i.e., planned ignoring; Iwata et al., 1994). For problem behavior maintained by social negative reinforcement, EXT involves the non-removal of the aversive stimulus (e.g., demands or tasks; Iwata, Pace, Kalsher, Cowdery, & Cataldo, 1990). This might involve procedures such as guided compliance (e.g., verbal, model, physical prompt hierarchy; Iwata et al., 1990) or continuing to deliver demands on a particular schedule (e.g., Repp, Felce, & Barton, 1988). Although it is sometimes difficult to determine the variables maintaining the occurrence of automatically reinforced problem behavior, several interventions

have been used in an attempt to disrupt the response-reinforcer contingency for behaviors maintained by automatic positive reinforcement (e.g., those that produce sensory stimulation such as visual, auditory, or proprioceptive stimuli). One such intervention involves the use of mechanical devices or protective equipment (e.g., helmets, gloves) that may inhibit (or block) the sensory consequences produced by the behavior (e.g., Kennedy & Souza, 1995; Rincover, 1978). Another intervention involves use of response blocking (Lerman & Iwata, 1996; Smith, Russo, & Le, 1999), which involves preventing or interrupting the occurrence of the problem behavior. For problem behavior maintained by automatic negative reinforcement (i.e., pain attenuation), EXT is not considered an ethical intervention (Iwata et al., 2000). For these behaviors, interventions should involve medical interventions to reduce pain or discomfort (e.g., medication to treat an ear infection) and/or training for the individual to communicate pain or obtain access to medical intervention.

Differential Reinforcement

The most common interventions for decreasing problem behavior are differential reinforcement procedures (Lennox, Miltenberger, Spengler, & Erfanian, 1988; Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993), which include differential reinforcement of other behavior (DRO) and differential reinforcement of alternative behavior (DRA; Fisher et al., 1993; Tiger, Hanley, & Bruzek, 2008; Vollmer & Iwata, 1992). DRO involves the delivery of the functional reinforcer for the absence of problem behavior after a period of time has passed (e.g., Lindberg, Iwata, Kahng, & DeLeon, 1999). DRA involves delivery of the functional reinforcer for the occurrence of an appropriate, alternative response (e.g., Carr & Durand, 1985). As mentioned above for other interventions, research has suggested the necessity of EXT in the efficacy of

differential reinforcement procedures (e.g., Hagopian, et al., 1998; Shirley, Iwata, Kahng, Mazeleski, & Lerman, 1997; Worsdell, Iwata, Hanley, Thompson, & Kahng, 2000).

A large number of studies has been conducted on the use of DRA for treating problem behavior, which is likely because DRA procedures include the direct training and reinforcement of an alternative response that allows the individual to both access the functional reinforcer and control the timing and amount of reinforcement (e.g., Carr & Durand, 1985; Fyffe, Kahng, Fittro, & Russell, 2004; Mace & Lalli, 1991). Although various behaviors may be trained and reinforced as alternative behaviors in DRA procedures, a common DRA procedure is functional communication training (FCT; Tiger et al., 2008), which involves training the individual to engage in a communication response (e.g., vocal request, gesture, and sign) to access the functional reinforcer. A large number of studies have shown the efficacy of FCT for increasing appropriate behavior and decreasing problem behavior in individuals with IDD (for detailed reviews see Fisher & Bouxsein, 2011; Hagopian et al., 2013; Tiger et al., 2008). Considerations for the implementation of FCT include (a) determining a low effort communication response (e.g., one that is currently in the individual's repertoire) that (b) can be understood by others in the environment (such that reinforcement can be delivered) and that (c) includes EXT for the occurrence of problem behavior (Fisher & Bouxsein, 2011; Tiger et al., 2008). Furthermore, when initially implementing FCT, the communication response must be reinforced immediately and on a dense schedule (Tiger et al., 2008). However, an important practical consideration when implementing FCT and other DRA procedures is that it is important to thin schedule of reinforcement over time, such that the procedures are likely to be implemented with high integrity in the natural environment (Fisher & Bouxsein, 2011; Hagopian, Boelter, & Jarmolowicz, 2011). Overall, research on DRA suggests robust effects for treating problem

behavior; additionally, some researchers have suggested that DRA continues to be effective when not implemented with high integrity, particularly after a history of being implemented with high integrity (St. Peter Pipkin, Vollmer, & Sloman, 2010).

DRA is often implemented using FCT for problem behavior maintained by social positive reinforcement and involves teaching the individual an appropriate communication response to access either attention or tangible items while implementing EXT for problem behavior (e.g., Hanley, Iwata, & Thompson, 2001; Rehfeldt & Chambers, 2003). For example, Hanley et al. (2001) treated the positively maintained (i.e., attention and tangibles) SIB and physical aggression of three adults with IDD using FCT and EXT. Initially, the functional communication response resulted in access to the functional reinforcer on an FR 1 schedule and problem behavior was placed on EXT. Experimenters used various thinning procedures to fade the schedule of reinforcement over time. Results of this study showed high levels of the FCT responses for all participants and decreased levels of problem behavior even as the schedule of reinforcement was thinned.

Various DRA procedures are effective for increasing appropriate behavior and decreasing problem behavior maintained by social negative reinforcement. First, several procedures have involved the provision of the functional reinforcer (escape) to decrease the occurrence of problem behavior. FCT is one procedure and involves teaching the individual an appropriate communication response to either request help or a break from the aversive context (e.g., task demands) while no longer providing escape for the occurrence of problem behavior (escape EXT; Carr & Durand, 1985; Marcus & Vollmer, 1995). In their seminal study, Carr and Durand (1985) showed large reductions in problem behavior when participants were trained an FCT

response to request help (e.g., “I don’t understand”) and problem behavior was placed on EXT during demand contexts.

Providing escape for compliance, rather than the communication response, is another function-based DRA procedure for treating escape-maintained problem behavior (e.g., Marcus & Vollmer, 1995; Slocum & Vollmer, 2015). Using compliance as the alternative behavior has several advantages including (a) increased likelihood of learning new skills because communicating to escape is not taking the entire learning period and (b) continued exposure to instructions, potentially resulting in habituation to the instructional situation, potentially making the situation less aversive. Research has suggested that a potentially more robust DRA procedure for increasing compliance and decreasing escape-maintained problem behavior involves delivering positive reinforcers such as edibles or enhanced breaks (e.g., access to preferred items and activities during the break) for compliance (e.g., Carter, 2010; Kodak, Lerman, Volkert, & Trosclair, 2007; Lalli et al., 1999; Slocum & Vollmer, 2015), even under conditions without escape EXT. Furthermore, these researchers suggest individuals prefer positive reinforcement as compared to negative reinforcement for compliance. An exception to this, however, includes conditions in which the reinforcement schedule is thinned to where a large amount of work is required to access reinforcement (e.g., DeLeon, Neidert, Anders, & Rodriguez-Catter, 2001). The mechanisms by which positive reinforcement for compliance is highly effective in the treatment of escape-maintained problem behavior is possibly due to either preference for robust positive reinforcers (i.e., edibles) over negative reinforcers delivered for short durations or an abolishing operation effect in which the inclusion of positive reinforcers reduces the aversiveness of the demand context (DeLeon et al., 2001; Lomas et al., 2010).

It is difficult to determine the sources of reinforcement for behavior maintained by automatic reinforcement (LeBlanc, Patel, & Carr, 2000; Vollmer & Iwata, 1992). Therefore, DRA procedures for automatically maintained behavior often involve providing positive reinforcers for engaging in alternative activities that compete with the occurrence of problem behavior such as engaging with leisure items (e.g., Charlop, Kirtz, & Casey, 1990; Favell et al., 1982; Rodriguez, Thompson, Schlichenmeyer, & Stocco, 2012). However, these procedures are often most effective when combined with consequent procedures for problem behavior such as brief restraint or response blocking procedures (e.g., Dorsey, Iwata, Reid, & Davis, 1982; Richman, Wacker, Asmus, & Casey, 1998). For example, Richman et al. (1998) treated the automatically maintained SIB (i.e., finger picking) of a 27-year old woman using DRA and response blocking (sensory EXT). That is, treatment consisted of blocking all instances of SIB, redirection to appropriate engagement with leisure items, and the delivery of praise contingent on participant engagement with the leisure items. The participant's SIB reduced to zero levels during the DRA plus sensory EXT condition. Researchers have suggested that differential reinforcement procedures may be effective in treating automatically maintained behavior due to (a) preference of the reinforcer provided for the alternative behavior or (b) preference for the means used to obtain relevant classes of reinforcers (i.e., reinforcers that produce matched stimulation to the behavior; Vollmer & Iwata, 1992).

In summary, given what is known about the common functions of problem behavior and effective function-based interventions derived from these functions, most behavior analysts recommend that interventions be individualized and based on the functional variables maintaining problem behavior for a particular individual (Hanley, 2011). Furthermore, the FBA and individualized treatment process has been described as having humanistic value due to

requiring the clinician to implement interventions for increasing socially appropriate behaviors derived from determining what about an individual's history has resulted in the occurrence of problem behavior (Hanley, 2011, 2012). Finally, this practice is recommended by federal statutes such as the Individuals with Disabilities Education Act of 2004 and is part of the ethical guidelines for practicing behavior analysts (Behavior Analyst Certification Board, 2014). However, given the extensive literature on common functions of problem behavior and effective function-based interventions, it may be important to begin discussing how knowledge of behavioral functions and interventions for problem behavior might be used to derive preventive approaches to prevent and reduce the occurrence of problem behavior (Ala'i-Rosales et al., 2018; Hanley, 2011).

Function-Based Prevention Approaches

Decades of research on the assessment and treatment of problem behavior in individuals with IDD (Beavers et al., 2013; Hanley et al., 2003) has (a) provided remarkable technology that has changed the understanding and treatment problem behavior and (b) demonstrated that individualized FBA and function-based treatment is best practice for treating problem behavior in the field of behavior analysis. However, there are some possible limitations of this process that support the need for problem behavior prevention approaches. Thus, a logical next step is to attempt to derive and evaluate the efficacy of prevention approaches that may serve as an initial approach to prevent or decrease problem behavior, potentially without the need for individualized FBAs and interventions for *all* targeted individuals. In this section, I argue for the importance of advancing professionals towards a prevention-based approach to problem behavior. First, I discuss the limitations of an individualized FBA and function-based treatment model in some environments (including community-based environments for adults with IDD)

that underscore the necessity of a prevention approach to problem behavior. Second, I describe the importance of a prevention model for problem behavior based on the health care prevention model and briefly discuss some areas of application and research in behavior analysis that have adopted this approach. Third, I review some recent discussion papers and research on prevention approaches to problem behavior that are based on FBA and function-based intervention literature.

Individualized assessment and intervention for problem behavior is considered best practice in behavior analysis; however, there are some limitations of this approach. First, conducting FBAs, deriving function-based interventions (or behavior support plans), and training and monitoring staff implementation of intervention plans require time, various resources, and expertise in these specific areas (Rotholz et al., 2013). Thus, for programs that do not have behavior analysts or other individuals trained in this process (e.g., preschools, community-based programs serving adults with IDD), it is unlikely that valid individualized assessments and effective interventions are being implemented. In fact, as outlined in a survey of states in the United States, Rotholz et al. (2013) found that many states do not have individuals with the credentials to conduct FBAs and implement function-based interventions; additionally, there is often a lack of adequate training for individuals to conduct FBAs and derive appropriate interventions for decreasing problem behavior in adults with IDD. Furthermore, when programs have experts in FBA and function-based interventions, they often have large caseloads of clients. Thus, the integrity with which large numbers of FBAs, individualized behavior plans, and staff training and monitoring procedures are implemented is challenged (Rotholz et al., 2013). The staff training and monitoring aspect of these responsibilities are compounded by several variables including high staff turnover and lack of skilled staff in some environments (Rotholz et

al., 2013). Second, due to challenges discussed above, the process of individualized FBA and intervention often takes a considerable amount of time when done with high integrity; thus, alternative approaches are needed to potentially decrease the occurrence of problem behavior until FBAs can be completed and function-based interventions (or behavior plan) can be derived, trained, and implemented (St. Peter & Marstellar, 2017).

Prevention usually includes primary, secondary, and tertiary categories of practice (National Research Council and Institute of Medicine, 2009). Primary prevention practices include a whole-systems approach implemented prior to the occurrence of an illness, meaning that practices are implemented across the entire target population in an attempt to reduce the future need of a focused or individualized intervention approach (US Centers for Disease Control and Prevention, 2019). Secondary prevention practices include a focused approach implemented to identify the illness in its earliest stages and are implemented with individuals at risk for developing the illness. Tertiary prevention practices include an individualized approach implemented with individuals with existing signs and symptoms of the illness. This prevention model is used by the health system to prevent illness (Center for Disease Control, 2019) and has also been adopted by various entities such as the public-school system to prevent the development and occurrence of problem behavior and increase pro-social behavior (e.g., School-wide Positive Behavioral Interventions and Supports [SWPBIS]; Sugai & Horner, 2008).

Preventive approaches are needed to reduce the need for reactive approaches to problem behavior in individuals with IDD (National Research Council and Institute of Medicine, 2009). Reactive approaches to problem behavior are typically costly and initiated only when problem behaviors are severe and dangerous (Fahmie, et al., 2018). Furthermore, expensive services are often needed for showing effective behavior change and obtaining levels of safety when reactive

strategies are used to treat problem behavior (National Institutes of Health, Consensus Development Panel on Destructive Behaviors in Persons with Developmental Disabilities, 1989; O'Connell, Boat, & Warner, 2009). Prevention procedures for problem behavior are often derived from the FBA and treatment literature and (a) are commonly implemented without prior individualized assessments, (b) are implemented across groups of individuals, and (c) can function as treatment to some individuals who already engage in problem behavior (given they are often derived from treatment literature [Carr et al., 2002]).

Adopting a prevention approach to problem behavior might benefit the field of behavior analysis given the limitations of individualized assessment and intervention in some environments and the importance of prevention models in various other areas of health and practice. That is, it might be beneficial to take what is known about the functions of problem behavior and effective function-based interventions to derive a prevention approach to problem behavior. Although prevention and intervention approaches for problem behavior have been discussed for decades in the behavior analytic literature (e.g., SWPBIS; Horner & Sugai, 2015), few systematic studies have evaluated the isolated effects of prevention packages that are based on the functional analysis and function-based intervention literature. That is, although response-to intervention frameworks that involve multi-tiered systems such as SWPBIS have based some of their procedures on the FBA and function-based intervention literature (Carr et al., 2002), these procedures are typically involved only in Tier III (tertiary level) of the system and involve individualized assessment and intervention for particular individuals in which Tier 1 and Tier II (secondary level) approaches are ineffective. Furthermore, these preventive approaches often involve many other variables (e.g., various systems change procedures, lifestyle changes, other environmental manipulations), as well as a multitude of different behavioral interventions,

neither of which are clearly described in the PBIS literature or consistently implemented across applications within the Positive Behavioral Support (PBS) framework. Finally, most research on the implementation of PBIS involves data collection using indirect measures (e.g., staff questionnaires), which do not allow for determination of the acquisition of skills by change agents or behavior changes in target individuals.

Prevention procedures may potentially function as a Tier I approach to prevention and treatment of problem behavior. Thus, these procedures could be implemented with all individuals receiving services; however, individualized FBAs and interventions would be conducted with individuals for whom the Tier I approach is ineffective. This approach may also be particularly useful in environments in which one (a) might need to intervene early (i.e., to obtain immediate reductions in problem behavior when FBA and function-based interventions are ongoing or cannot yet be implemented) or (b) resources to conduct individualized FBAs and function-based interventions are limited (e.g., few behavior analysts such as community-based programs for adults). Furthermore, the prevention approach may result in increases in important prosocial behaviors, increases in the efficacy of individualized intervention, and promote high quality habilitation environments that improve quality of life (Ala'i-Rosales et al., 2019). Finally, although these prevention procedures may not prevent or reduce the occurrence of problem behavior in some individuals (that may have behavior under the control of more complex contingencies), it is unlikely that they'll cause harm and may likely decrease escalation of the current intensity or frequency of problem behavior (Ala'i-Rosales et al., 2019).

Although few studies have derived prevention procedures for problem behavior that are based on the functional analysis and function-based intervention literature, a recent discussion paper (i.e., Ala'i-Rosales et al., 2019) and a few research studies (e.g., Fahmie, Iwata, & Mead,

2016; Fahmie et al., 2018; Hanley, Heal, Tiger, & Ingvarsson, 2007; St. Peter & Marstellar, 2017) have suggested an increased focus in this area. In a recent discussion paper, Ala'i-Rosales et al. (2019) proposed the need for applying what is known about common functions of problem behavior and function-based interventions for prevention practices in early intervention. Ala'i-Rosales and colleagues suggested teaching various replacement behaviors to be used in various situations that are commonly associated with the occurrence of problem behavior (i.e., contingencies evoking and maintaining the occurrence of problem behavior). Specifically, the authors suggested teaching children to (a) appropriately communicate wants and needs including likes and dislikes (e.g., access to preferred items and activities; escape from or help during aversive situations); (b) appropriately request attention from others; (c) appropriately engage in play and leisure activities alone and with others (i.e., engage in behaviors that compete with the occurrence of problem behavior); and (d) tolerate difficult situations for which escape may not be feasible (e.g., medical appointments, changes in routines). Furthermore, the authors proposed including other procedures such as (a) promoting nurturing learning environments that include providing noncontingent positive reinforcement, differential reinforcement, and matching the demands placed to children's skill level, (b) collaborating with families, (c) implementing other behavior change procedures (e.g., environmental modifications, prompting procedures, and consequences) for developing prosocial behavior, and (d) using well-designed procedures for personnel training. These recommendations are in line with recommended practice in early childhood education as proposed by the Division for Early Childhood (DEC; 2014).

Few studies have taken what is known about common functions and function-based interventions to derive prevention procedures for problem behavior. St. Peter and Marsteller (2017) extended research by Harding et al. (1994) and Millard et al. (1993) by showing that

function-based treatment packages that involved interventions to address potential attention, escape, and tangible functions (i.e., the functions that maintain most problem behavior as evidenced in the literature; Beavers et al., 2013) reduced the occurrence of problem behavior and increased appropriate replacement behavior displayed by three children without IDD. In this study, sessions were conducted in a demand context in which the participant was prompted to complete academic worksheets. During the intervention phase, appropriate requests resulted in an enriched break that involved 30 s of escape with access to therapist attention and leisure items; additionally, problem behavior did not result in escape, attention, or leisure items (i.e., EXT was in place). Overall results of this study showed a reduction in problem behavior. Additionally, this study demonstrated the utility of a procedure that involved a packaged intervention based on common social functions of problem behavior and function-based interventions. However, limitations of this study included the use of various rules to increase appropriate behavior and decrease problem behavior, a response cost procedure for the occurrence of problem behavior for one participant, and the lack of evaluation of procedures for contexts other than demand contexts (and requests other than a "break"). Furthermore, the researchers noted that this was a preliminary evaluation of this type of intervention; thus, various areas of future research in this area are warranted. For example, future research is needed in evaluating the degree to which caregivers could be trained to implement such procedures as well as the degree to which these procedures would be effective in more naturalistic environments such as classrooms or homes. Furthermore, there is need for such procedures to be evaluated with other populations (e.g., adults with IDD) and with participants with more limited abilities. Finally, comparisons of the efficacy of this type of intervention to those based on individual

FBAs and treatment should be conducted in addition to evaluations of consumer and caregiver preference for these two types of approaches.

In a more developed prevention approach, Hanley, Heal, Tiger, and Ingvarsson (2007) initially describe a classwide program for promoting function-based prosocial skills called "Preschool Life Skills" (PLS). PLS was created to prevent and treat problem behavior in preschool programs. To develop this program, the authors reviewed the literature on common functions of problem behavior, function-based interventions (i.e., functional communication research to access common social reinforcers), and information provided by kindergarten teachers on necessary child skills for success in kindergarten (Fahmie & Luczynski, 2018). This information resulted in the development of 13 PLS that are separated into four units. The first three units involve teaching children function-based prosocial skills such as (a) compliance with single and multi-step instructions, (b) appropriate requests to access preferred consequences (attention and preferred items/activities from adults and peers), and (c) tolerating delays to reinforcement (e.g., attention, access to preferred items, and help from teachers and peers). The fourth unit involves teaching children prosocial skills focused on important "friendship skills" such as supporting others and showing empathy (e.g., saying, "thank you," complimenting others, sharing toys, and comforting others when they appear hurt or sad).

In the original study on PLS, Hanley et al. (2007) used BST (i.e., rationale and description, modeling, and rehearsal with feedback; Miltenberger, 2016) to teach the 13 skills to 16 children in a university-based preschool classroom. Specifically, teachers trained children on each skill one at a time in a sequential fashion. Each skill was initially introduced to children during large group instruction in which the teacher described the skill and provided a rationale for the importance of the skill. This was followed by teachers modeling the skill and having

each child practice the skill. Following the introduction and practice of the skill, teachers provided opportunities for the particular skill to occur throughout the course of the day (i.e., provided evocative situations for the skill to occur) with all children. If a particular child correctly engaged in the skill, teachers provided descriptive praise and when applicable, provided the reinforcer requested by the child (e.g., attention for appropriate requests for attention), However, if the child failed to correctly engage in the skill or engaged in problem behavior, teachers implemented BST (i.e., modeling, practice, and feedback) until the child correctly engaged in the skill. For each skill, teaching occurred until each child had experienced at least 10 opportunities to engage in the skill and had exhibited the skill correctly on at least five of those opportunities. Additionally, each skill was trained over the course of two full school days. Results of this study showed increased levels of children engaging in the PLS skills, which was associated with large decreases in problem behavior.

The efficacy of the PLS program has been replicated in various studies including Head Start classrooms (Hanley, Fahmie, & Heal, 2014). Furthermore, although PLS was originally designed to be a Tier 1 approach to increase prosocial behavior and decrease or prevent the occurrence of problem behavior in classwide applications for all children, it has also been used as a Tier 2 approach in teaching small groups of children a subset of prosocial skills (e.g., Beaulieu & Hanley, 2014; Luczynski & Hanley, 2013) and as a Tier 3 approach in which 1:1 intervention has been applied in teaching various skills (e.g., Francisco & Hanley, 2012) to children for whom the Tier 1 approach was ineffective. These Tier 2 and 3 approaches allowed for more teaching opportunities and modifications to increase the likelihood of acquisition of the skills as well as continued teaching until mastery was achieved (Fahmie & Luczynski, 2018). Finally, one randomized control trial study (Luczynski & Hanley, 2013) suggested the utility of

PLS in prevention of problem behavior for groups of preschool children. In this study, results showed that children in the test group (who received PLS training on various skills) showed acquisition of the skills and zero levels of problem behavior. However, children in the control group (who did not receive PLS training on those skills) displayed higher levels of problem behavior after the same period of time. That is, problem behavior worsened over time for children in the control group. According to the authors, this study provided preliminary information regarding the utility of teaching PLS for the prevention of problem behavior in young children. However, additional research is needed on the generalization of PLS from the training environment and the application of a similar procedure to other populations and environments (e.g., adults in community settings).

Packaged interventions based on common functions of problem behavior may be more complex than individualized interventions, particularly if individualized interventions are only based on one function (Ala'i-Rosales et al., 2019; St. Peter and Marstellar, 2017); however, there are some distinct potential advantages to these packages. First, this Tier 1 approach could be used to train teachers or staff to prevent or decrease the occurrence of problem behavior in their work environments without the need for individualized assessment and intervention for all individuals. That is, prevention procedures may be effective for influencing behavior change without the need for individualized assessment and intervention for some individuals. Second, this Tier 1 approach to preventing and decreasing problem behavior could be implemented while more individualized assessments are being conducted. Third, this approach could be useful for individuals for whom problem behavior is multiply controlled. As suggested by Beavers et al. (2013), approximately 19% of problem behavior in the published functional analysis literature is maintained by more than one functional variable; thus, package interventions that address

multiple common functional variables would address multiply controlled problem behavior. This may be particularly important for individuals whose problem behavior may be maintained by complex or synthesized contingencies (Hanley, Jin, Vaneselow, & Hanratty, 2014). Fourth, this method may prevent the transfer of problem behavior function from one variable to another over time. Although little research has been conducted on transfer of function, Lerman et al. (1994) showed that treatment relapse was due to a change in function for two out of four individuals who had previously received effective function-based treatment. Thus, function-based packages that address all potential common functional variables may decrease the likelihood of this phenomenon.

To date, the majority of discussion papers and studies on prevention approaches based on the functions of problem behavior and function-based interventions have involved children, and with the Hanley and colleague studies, most participants were typically developing preschool children. Another population of individuals in which this model of prevention may be warranted is adults with IDD in community-based programs. Furthermore, studies to date have involved teaching children replacement behaviors (e.g., functional communication responses) to access functional reinforcers. However, another important area to focus on is using information on common antecedent and consequent interventions based on the common functions of problem behavior to make modifications to the environment (e.g., staff interactions) in an attempt to decrease the likelihood of problem behavior and increase the likelihood of appropriate behavior (including appropriate communication). In fact, studies on the generality of the effects of PLS (e.g., Luczynski, Hanley, & Rodriguez, 2014) suggest that focusing on teaching children to engage in particular behaviors is effective for behavior change in the environments in which those skills were trained; however, there are limitations in generalization of these skills to

environments that may not support the occurrence of these newly acquired skills (e.g., lack of resources to adequately train necessary skills and varying levels of ability in adults with IDD).

In summary, decades of research on the assessment and treatment of problem behavior provide an operant model of prevention for the occurrence of problem behavior. That is, many research studies have suggested the utility of modifying establishing operations (e.g., NCR), no longer delivering reinforcers that maintain problem behavior contingent on the occurrence of problem behavior (i.e., EXT), and teaching appropriate replacement behaviors (e.g., DRA). However, little research has been conducted to (a) determine what a comprehensive prevention package might entail, (b) evaluate the efficacy of such prevention package, and (c) determine whether staff could be trained to implement such a prevention package for decreasing the occurrence of problem behavior in *adults in community environments*.

History and Purpose of Current Study

Prior to discussing the specific purpose of the current study, it is important to provide some background regarding how this project began. Additionally, it is important to set the stage for our approach regarding what and how we trained staff on our prevention approach. In the fall of 2016, our lab (including eight doctoral students and one faculty member from the University of Kansas' Applied Behavioral Science Department) was contracted by a large company serving adults with IDD in the Kansas City Metro area. Specifically, the company provided services in day programs and various homes categorized as intermediate care facilities for persons with developmental disabilities (ICF/DD) and home and community-based services (HCBS). Initially, we were contracted to conduct FBAs, write individualized behavior plans, and train staff on these individualized behavior plans for approximately 30 adult consumers with IDD who were reported to engage in severe problem behavior (e.g., physical aggression, SIB, and property

destruction). However, based on our initial observations of these consumers across the homes and day programs, we observed (a) a lack of staff implementation of basic antecedent and consequent procedures that may prevent the occurrence of problem behavior, (b) a lack of procedures for promoting consumer engagement, and (c) consumer problem behavior and staff interactions that suggested possible maintenance of problem behavior by multiple social variables (i.e., to access attention, preferred items and activities, and escape aversive situations; Beavers & Iwata, 2011).

Based on these observations and in conjunction with the administration of the company, we decided to postpone efforts for conducting individualized assessment and treatment and focused instead on an initial effort to provide a simple staff training addressing the observed deficits in staff interactions across the homes and programs. Therefore, we reviewed the literature on functions of problem behavior and function-based interventions, as well as the literature on active treatment for adults with IDD to determine the skills to train staff. Based on this review, we derived four skills, which we collectively termed "healthy behavioral practices." Healthy behavioral practices included training staff to promote positive interactions with consumers, provide effective instructions to consumers, respond correctly to problem behavior displayed by consumers, and provide access to preferred items and activities to consumers. Our study involved training a large number of staff across a large number of homes and programs to implement each of the four healthy behavioral practices using BST and on-the-job feedback (OJF; Parsons et al., 2012). It is important note that the focus of this study was changing multiple important behaviors in a large number of staff across a large number of homes and programs.

Method

Participants and Setting

Participants were approximately 150 staff and various consumers from 16 group homes and three day programs in a large company serving adults with IDD in the Kansas City metro area. Staff who worked in the homes and programs were at least 19-years-old and had at least a high-school diploma or general equivalence degree (GED). The large number of staff included was due to various factors. First, staff included day and night staff, weekday and weekend staff, and regular and substitute staff who filled in when regular staff were absent. Second, new staff were included at various times throughout the study given the relatively high staff turnover in some of the homes and programs. Thus, staff were not necessarily consistent within a home or program across phases in our study.

All staff participated in a mandatory new-hire training (5-day training program [Monday - Friday, 9 a.m. – 5 p.m.]) prior to working in the homes and programs, and therefore participating in our study. This new-hire training included orienting staff to company systems and technologies such as checking in and out of work; logging hours worked; managing, handling, and administering medications; and operating company vehicles. Training also included teaching staff to avoid, recognize, and report abuse, neglect, and exploitation, as well as to implement safety emergency procedures such as cardiopulmonary resuscitation (CPR) and First Aid. Additionally, training involved teaching staff strategies for occasioning appropriate behavior such as rapport building, providing various prompts in demand situations, and using task analyses to complete complex behavior chains. Furthermore, training included a discussion on the antecedents and consequences of problem behavior as well as general problem behavior management strategies (e.g., minimize attention to the problem behavior) and data collection. Staff were also trained on using The Mandt System ® as the antecedent and crisis management

program for consumer problem behavior at the time of our study. The Mandt System ® emphasized positive interactions with consumers, providing consumers with choices of activities with which to engage, recognizing consumer problem behavior and intervening in its earliest stages, engaging in active listening, implementing physical intervention procedures to deescalate problem behavior (if necessary), and finally, debriefing about the problem behavior with consumers once signs of problem behavior were no longer present.

Consumers who participated in this study were adults with IDD (e.g., mental retardation, Down Syndrome, and autism spectrum disorder) who were between 18- and 60-years-old and lived in the community-based homes (i.e., group homes, family teaching model homes, or supervised apartments) or attended the day programs where we conducted the study. Most participants were reported to engage in minor problem behavior (e.g., inappropriate verbal behavior), severe problem behavior (e.g., physical aggression), or both, for which they had an individualized behavior support plan developed by behavior specialists or home coaches under the supervision of the behavior specialists employed by the company.

Consultants conducted all trainings, observations, and feedback sessions. All consultants were enrolled as fulltime doctoral students in the Department of Applied Behavioral science at the University of Kansas. Of the eight consultants, six were board certified behavior analysts (BCBAs) and three were receiving supervised experience and enrolled in courses in order to fulfil the requirements for becoming BCBAs. All consultants had prior experience in the assessment and treatment of problem behavior and function-based interventions prior to serving as consultants in this study. Additionally, each of the consultants provided behavioral services to children with or without IDD as part of a 20-hours per week funding line in various programs at the time of the current study. Two doctoral-level behavior analysts, who were faculty in the

department, trained and supervised all consultants. Specifically, one faculty specialized in the assessment and treatment and severe problem behavior and focused on training the healthy behavioral practices; the second faculty specialized in performance management and focused on training the data collection and feedback process. All consultant training and supervision took place during weekly meetings from the beginning to the end of the study. All weekly meetings lasted about two hours and consisted of training on healthy behavioral practices, reviewing the training and feedback process, problem solving, and data review. All training of the consultants consisted of the doctoral-level faculty modeling the training and feedback process as they would if they were training staff in the homes and programs. Finally, training meetings ended with faculty soliciting and answering questions that the consultants may have had.

All initial trainings, observations, and on-the-job feedback took place in the homes between 6 a.m. and 9 p.m., Monday through Sunday; and in the day programs between 9 a.m. and 3 p.m., Monday through Friday (operation hours for the day programs). During these times, doctoral student consultants worked with home coaches and supervisors to determine the best times to go to the homes and programs to conduct trainings and observations. These times were those in which consumers and staff would be present, and in which staff were not busy with various routine tasks (e.g., self-care routines). Initial training sessions took place in a quiet corner or location within the homes or programs such as the staff office, dining room, or kitchen. Initial training was conducted with one or two staff who were scheduled to work in the home or program. During initial training sessions, another staff or supervisor filled in for staff being trained to ensure staffing ratios were met. Observations took place in the common areas of homes (e.g., living room, dining room, or kitchen) during times in which staff and consumers were scheduled to be in the homes and engaged in at least some activities in these common areas

such as leisure activities (e.g., playing games, watching TV), instructional activities (e.g., meal preparation), and family-style meals (e.g., consumers and staff sitting and eating together at the table). Observations took place in various large and small rooms at the day programs anytime during operational hours during which various classes (e.g., music class), instructional activities (e.g., animal care), work-related tasks (e.g., recycling), and leisure activities (e.g., card games) occurred. Staff feedback was provided after observations with the staff on shift and all feedback occurred after staff had received prior training. Specifically, feedback took place in a quiet corner of the homes or programs or in a small staff office. Observations and on-the-job feedback were conducted with staff present in the home that had received initial training either that day or previously. Multiple initial trainings and observations with feedback could be conducted in one visit to the home or program. Initial training sessions were approximately 15 min. All observations were 15 min. Feedback sessions were approximately 5 min, depending upon how much corrective feedback was required.

Response Measurement, Interobserver Agreement, and Data Analysis

We created four competency checklists (described in detail below) that were used to both collect data and provide staff with feedback on their performance on each of four healthy behavioral practices (i.e., provide positive interactions, provide effective instructions, respond correctly to problem behavior, and promote consumer engagement). Trained graduate and undergraduate students collected data on each healthy behavioral practice during 15-min observations. Below are descriptions of the competency checklists, data collection procedures, interobserver agreement calculations, and data analyses for each of the four heathy behavioral practices.

Positive interactions. Data were collected on positive interactions in 16 homes and three day programs. Observers used the checklist in Appendix A to collect data on the number of different positive interactions delivered by a target staff to each consumer present in the common areas during 5-min intervals in the 15-min observation. The 5-min interval was chosen because during our training procedures (see below), staff were trained to provide positive interactions at least once every 5 min to consumers in their vicinity. Prior to the observation, observers determined which target staff to observe (based on which staff was providing supervision in the common areas of the homes or programs) and which of the four consumers (maximum) present in the common areas of the home or program to include in their observation. If a home or program had more than four consumers present in the common areas, observers picked the four consumers they saw first to include in the observation. During the 15-min observation, data collectors scored whether the target staff provided each of six types of positive interactions (i.e., give a compliment, converse with consumer, greet consumer, provide appropriate physical interaction, provide expression of care, and provide praise) to each target consumer present during each 5-min interval. However, the consumer had to be present for at least half of the interval (2.5 min) for the interval to count. Positive interactions were only scored if they were delivered with a pleasant facial expression (i.e., they could not be frowning or grimacing). A *compliment* was defined as saying something favorable about the consumer to the consumer and included statements such as, "You look nice today!" *Conversation* was defined as talking about topics that consumers may prefer or commenting on an activity they were engaged in and included statements such as, "I really love that necklace you are making! I wish I was that creative." *Greet* was defined as a salutation to the consumer and included statements such as, "Hi! Great to see you!" *Appropriate physical interaction* was defined as making

physical contact that is appropriate for adults such as high-fives or pats on the back. E*xpression of care* was defined as acknowledging when consumers appeared sad, tired, upset, or needed help, and included statements such "You look sad. Are you OK?" *Praise* was defined as acknowledging appropriate consumer behavior and included statements such as "Excellent job putting your dishes away!" Instructions or commands (e.g., "Put your headphones in your room.") were not scored as positive interactions.

First, we analyzed data for the main dependent variable, which was the percentage of 5-min intervals of overall positive interactions for each observation and was calculated by dividing the number of intervals across consumers present in which the target staff provided a positive interaction by the total number of intervals across consumers present. For example, if there were three consumers present for all 5-min intervals (9 total intervals), and of those intervals, the target staff provided positive interactions to consumers in 8 of those intervals, researchers divided 8 by 9 to get a percentage of 88.9% positive interactions. Second, we analyzed the mean percentage intervals in which each type of positive interaction (e.g., compliment, conversation, praise) occurred in each phase (baseline and BST + OJF) for each program. For this calculation, we first determined the mean percentage of intervals of each type of positive interaction for each observation in a phase for a particular home or program and averaged those session means. These data allowed us to determine whether increases in certain types of positive interactions occurred across phases in the homes and programs. Third, we analyzed the mean percentage of intervals of overall positive interactions for applicable individual staff across phases (baseline and BST + OJF). That is, for staff for which we have both baseline and post-training data, we conducted a pre-post comparison of their baseline and BST + OJF performance regarding their percentage of intervals of overall positive interactions to determine the effects of our training at

the individual level. Fourth, we analyzed the effects of training alone (BST) and training plus on-the-job observations and feedback (BST + OJF) on applicable individual staff performance by comparing the mean of overall staff positive interactions in baseline, in the first observation following initial training (BST), and in subsequent observations following on-the-job feedback (BST + OJF). These data allowed us to determine the effects of initial training and training plus on-the-job feedback on staff provision of positive interactions to consumers.

A second independent observer collected data for at least 23% of observations across all phases and programs in order to determine interobserver agreement (IOA). An interval-by-interval agreement method for each type of interaction was used. An agreement was scored if both observers agreed whether a particular type of positive interaction occurred in an interval. IOA was calculated by dividing the number of agreement intervals for each interaction by the total number of intervals and multiplying by 100%. Overall IOA for an observation session was calculated by averaging the IOA scores for positive interactions. For home E-1, mean IOA for positive interactions was 97% (range: 90 - 100%). For home W-1, mean IOA was 97% (range: 87 - 100%). For program D-1, mean IOA was 98% (range: 95 - 100%). For home F-9, mean IOA was 95% (range: 87 - 100%). For home F-12, mean IOA was 98% (range: 93 - 100%). For program D-2, mean IOA was 90% (range: 57 - 98%). For home F-3, mean IOA was 96% (range: 83 - 100%). For home F-2, mean IOA was 97% (range: 83 - 100%). For home F-6, mean IOA was 92% (range: 84 - 100%). For home L-7, mean IOA was 97% (range: 94 - 100%). For home P-1, mean IOA was 90% (range: 74 - 98%). For home T-1, mean IOA was 93% (range: 83 - 100%). For home F-17, mean IOA was 92% (range: 83 - 100%). For home C-1, mean IOA was 95% (range: 88 - 100%). For home L-4, mean IOA was 97% (range: 95 - 100%). For home L-5, mean IOA was 99% (range: 95 - 100%). For home G-1, mean IOA was 95%

(range: 78 - 100%). For program D-3, mean IOA was 98% (range: 92 - 100%). For home O-1, mean IOA was 99% (range: 96 - 100%). All IOA scores under 80% were immediately followed by data collector retraining on the behavioral definitions.

Effective instructions. Data were collected on effective instructions in 15 homes and three day programs. Observers used the data sheet in Appendix B to collect data on each instruction delivered by a target staff and on whether that instruction was delivered with a pleasant tone and facial expression, phrased as a "do" request, and included a tell/prompt instruction sequence during 15-min observations. Prior to the observation, data collectors determined which target staff to observe (based on which staff was providing supervision in the common areas of the programs). During observations, staff were observed providing instructions to any number of consumers in the common areas of the programs. Data collectors scored an instruction by writing down each instruction delivered by staff. An instruction was defined as staff requiring a specific behavior from the consumers by delivering a directive or command to consumers (e.g., "Put your jacket on."). A new instruction was only scored when the staff specified a different task or behavior to be completed. Therefore, rephrasing an instruction that specified the same behavior or task was not considered a new instruction. A *pleasant voice tone and facial expression* was scored for an instruction if the target staff delivered the entire instruction sequence for each new instruction in a friendly manner (i.e., absence of frowning and grimacing, use of conservation-level voice tone). *Phrased as a "do"* request was scored for an instruction if the target staff specified what consumer(s) should *do* such as, "Use your fork" throughout the entire instructional sequence. An instruction was not scored if the staff phrased the request as a question (e.g., "Would you like to use your fork?") or as a "don't" request (e.g., "Don't use your knife to pick up your peas!"). *Tell/prompt instruction* was scored for an

instructional sequence in various ways depending on consumer compliance. If the target staff delivered the initial verbal (tell) instruction with or without an additional prompt (model, gesture, physical), and the consumer complied within 10 s, then the instruction was scored as tell/prompt instruction. However, if the staff delivered the initial verbal (tell) instruction without a prompt, and the consumer did not comply within 10 s, then at some point in the instructional sequence (before a new instruction was delivered), the staff had to provide the instruction again with an additional prompt (model, gesture, physical) to increase the likelihood of compliance for the instruction to be scored as a tell/prompt instruction. In summary, the target staff could provide additional prompts (i.e., model, gestural, or physical prompts) with a verbal (tell) prompt at any point during the instructional sequence, but an instruction was only considered a *tell/prompt instruction* if the consumer complied with the initial verbal prompt or if staff provided a model, gestural, or physical prompt at some point following consumer noncompliance prior to moving on to a new instruction.

First, we analyzed data for the main dependent variable, which was the percentage of correct instructions. A correct instruction was defined as an instruction delivered using a pleasant voice tone and facial expression, phrased as "do" requests, and delivered as a tell/prompt instruction. The percentage of correct instructions was calculated by dividing the number of correct instructions by the total number of instructions delivered by the target staff in each 15-min observation. For example, if there were 12 instructions delivered in a particular observation and 7 of those instructions were correct, researchers divided 7 by 12 to get a percentage of 58.3% of correct instructions. Second, we analyzed the mean percentage of instructions in which each instructional element (i.e., pleasant voice tone and facial expression, "do" requests, and tell/prompt instructions) occurred in each phase (baseline and BST + OJF) for

each home and program. This allowed us to determine whether increases in these separate instruction elements occurred across phases in the homes and programs. Third, we analyzed the mean percentage of correct instructions for applicable individual staff across phases (baseline and BST + OJF). That is, for staff for whom we had baseline and post-training data, we conducted a pre-post comparison of their baseline and BST + OJF performance regarding their percentage of correct instructions to determine the effects of our training at the individual level. Fourth, we analyzed the effects of initial training alone (BST) and training plus on-the-job observations and feedback (BST + OJF) on individual staff performance by comparing the mean percentages of effective instructions displayed by individual staff in baseline, in the first observation following initial training (BST), and in subsequent observations following on-the-job observations and feedback (BST + OJF). These data allowed us to determine the effects of initial training and training plus on-the-job feedback on staff provision of effective instructions.

A second independent observer collected data for at least 25% of observations across all phases in order to determine IOA. Researchers used two calculation methods to determine IOA. First, a total IOA calculation method was used to determine observers' agreement on the number of instructions provided by staff. Researchers calculated this by dividing the smaller number of instructions scored by the larger number of instructions scored and multiplying by 100%. Second, an instruction-by-instruction (similar to trial-by-trial) method for each of the three elements of an effective instruction was used to determine observers' agreement on whether each instruction met the criterion for that element. Only instructions both observers agreed to have occurred were included in this IOA calculation method. An agreement was scored for each instruction element if both observers agreed that it occurred. IOA was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by

100%. For home E-1, mean IOA was 94% (range: 87 - 100%). For home W-1, mean IOA was 87% (range: 75 - 93%). For program D-1, mean IOA was 84% (range: 69 - 100%). For home F-9, mean IOA was 93% (range: 75 - 100%). For home F-12, mean IOA was 94% (range: 91 - 98%). For program D-2, mean IOA was 95% (range: 90 - 100%). For home F-3, mean IOA was 100%. For home F-2, mean IOA was 97% (range: 83 - 100%). For home F-6, mean IOA was 91% (range: 67 - 100%). For home P-1, mean IOA was 95% (range: 79 - 100%). For home T-1, mean IOA was 97% (range: 87 - 100%). For home F-17, mean IOA was 96% (range: 90 - 100%). For home C-1, mean IOA was 94% (range: 75 - 100%). For home L-4, mean IOA was 90% (range: 79 - 100%). For home L-5, mean IOA was 96% (range: 87 - 100%). For home G-1, mean IOA was 90% (range: 76 - 100%). For program D-3, mean IOA was 87% (range: 79 - 94%). For home O-1, mean IOA was 99% (range: 97 - 100%). All IOA scores under 80% were immediately followed by data collector retraining on the behavioral definitions.

Responding to problem behavior. Data were collected on responding to problem behavior in 14 homes and three day programs. Observers used the checklist in Appendix C to collect data on whether staff (a) responded correctly to minor disruptive behavior (e.g., inappropriate verbal behavior), (b) responded correctly to severe problem behavior, and (c) provided correct high-quality interactions in 3-min intervals of the 15-min observation. As outlined on the back of the checklist (Appendix C), minor disruptive behavior included inappropriate verbal behavior (e.g., screaming, teasing, arguing, complaining) as well as any other non-harmful problem behavior (i.e., instances of behavior that may disrupt the environment but could not harm self, others, or property such as banging on the table or forcefully closing doors). Also, as outlined on the back of the checklist, severe problem behavior included any behavior that could result in harm such as physical aggression (e.g., hitting or kicking others),

self-injurious behavior (e.g., biting or hitting oneself), property destruction (e.g., throwing or tearing items), and inappropriate sexual behavior (e.g., exposing oneself to others). Prior to the observation, observers determined which target staff to observe (based on which staff was providing supervision in the common areas of the homes or programs) and which four consumers (maximum) in the common areas to include in the observation. If a home or program had more than four consumers present, then observers picked the first four consumers they saw to include in the observation. The consumer could be present for any duration of the interval for the interval to count. Correct or incorrect responses to problem behavior were not scored if there were no opportunities for staff to respond correctly or incorrectly to problem behavior (e.g., problem behavior does not occur). However, data collectors recorded staff provision of high-quality interactions during all observations. *Correct responses to minor disruptive behavior* were scored if the target staff withheld commenting on minor disruptive behavior at any time during the interval. However, a correct response was scored if staff provided choices to the consumer (e.g., "Would you like to keep reading that book, or would you like to do this puzzle?"), redirected consumers to the ongoing activity (e.g., "Wow, those pictures are cool in your book."), continued with a demand (e.g., "Let's finish setting the table together"), or engaged in other interactions with the consumer that did not involve talking about or commenting on the disruptive behavior. *Correct responses to severe problem behavior* were scored if the target staff withheld commenting on severe problem behavior throughout the interval *and* withheld all attention and items/activities until at least 10 s without the occurrence of severe problem behavior. The only exception was when staff needed to intervene for safety (e.g., response blocking); however, when they did so, it was only scored as correct if they did not make eye contact or say anything to the consumer. *Correct high-quality interactions* were

scored when the target staff engaged in any positive interaction (e.g., conversation, praise, physical attention) in the absence of severe problem behavior (i.e., the consumer had not engaged in severe problem behavior for at least 10 s).

First, we analyzed the main dependent variables, which was the percentage of 3-min intervals of overall staff correct responses to problem behavior (both minor disruptive behavior and severe problem behavior) and staff correct high-quality interactions. The percentage of overall staff correct responses to problem behavior was calculated by dividing the number of intervals across consumers in which staff responded correctly to *both* minor disruptive behavior and severe problem behavior by the total number of intervals in which staff responded correctly or incorrectly to both minor disruptive behavior and severe problem behavior. If NA was scored for both, then that interval did not count in the calculation. However, if NA was scored for one but the other was scored as either correct or not correct, then that interval was used in the calculation. For example, if there were four consumers present for all 3-min intervals (20 intervals), and of those intervals, a Y or N was scored for correct response to either minor disruptive behavior or severe problem behavior during 14 of those intervals, and correct responding to minor disruptive behavior and severe problem behavior occurred in seven of those intervals, researchers divided 7 by 14 to get 50% intervals of correct responses to problem behavior (minor disruptive and/or severe problem behavior). The percentage of intervals of staff correct high-quality interactions was calculated by dividing the number of intervals in which staff provided correct high-quality interactions (scored Y) by the number of intervals in which staff did (scored Y) and did not (scored N) provide a correct high-quality interaction when applicable (i.e., when staff had an opportunity to deliver a high-quality interaction in that interval, which would be the case unless the consumer was engaging in severe problem behavior

throughout the entire interval). Second, we analyzed the mean percentage of intervals of staff overall correct responses to problem behavior (minor disruptive behavior and severe problem behavior) for applicable individual staff across baseline and BST + OJF phases. That is, for staff for whom we have baseline and BST + OJF data, we conducted a pre-post comparison of their baseline and post-training performance regarding their percentage of overall correct responses to problem behavior to determine the effects of our training at the individual level. Third, we analyzed the effects of initial training alone (BST) and training plus on-the-job observations and feedback (BST + OJF) on individual staff performance by comparing the mean percentages of overall staff correct responses to problem behavior in baseline, in the first observation following initial training (BST), and in subsequent observations following training and on-the-job observations and feedback (BST + OJF). These data allowed us to determine effects of initial training and training plus on-the-job feedback on staff engagement in correct responses to problem behavior.

A second independent observer collected data for at least 30% of sessions across all phases and programs in order to determine IOA. An interval-by-interval agreement method for each type of staff response (i.e., correct responses to minor disruptive behavior, correct responses to severe problem behavior, and correct high-quality interactions) was used. An agreement was scored if both observers agreed whether a particular type of staff response occurred in an interval. IOA was calculated by dividing the number of agreement intervals for each staff response by the total number of intervals and multiplying by 100%. Overall IOA for an observation session was calculated by averaging IOA scores for the different staff responses to problem behavior. For home E-1, mean IOA was 93% (range: 82 - 100%). For home W-1, mean IOA was 89% (range: 78 - 88%). For program D-1, mean IOA was 96% (range: 87 -

100%). For home F-9, mean IOA was 96% (range: 93 - 100%). For home F-12, mean IOA was 100%. For program D-2, mean IOA was 94% (range: 86 - 100%). For home F-3, mean IOA was 90% (range: 80 - 100%). For home F-2, mean IOA was 98% (range: 89 - 100%). For home F-6, mean IOA was 95% (range: 80 - 100%). For home P-1, mean IOA was 94% (range: 82 - 100%). For home T-1, mean IOA was 98% (range: 88 - 100%). For home F-17, mean IOA was 96% (range: 92 - 100%). For home L-4, mean IOA was 94% (range: 80 - 100%). For home L-5, mean IOA was 96% (range: 85 - 100%). For home G-1, mean IOA was 99% (range: 97 - 100%). For program D-3, mean IOA was 93% (range: 81 - 100%). For home O-1, mean IOA was 96% (range: 90 - 100%). All IOA scores under 80% were immediately followed by data-collector retraining on the behavioral definitions.

Consumer engagement. Data were collected on consumer engagement in 15 homes and three day programs. Observers used the checklist in Appendix D to collect data on whether any staff present provided consumers (4 maximum) in the common areas with (a) interaction for appropriate engagement and (b) choices of items or activities at any point in each 3-min interval of the 15-min observation. In addition, observers collected data on whether each consumer was appropriately engaged with an item or in an activity at any point in each 3-min interval of the 15-min observation. Prior to the observation, observers determined which staff and consumers to observe. Staff were included in the observation if they were providing supervision in the common areas of the homes or programs; thus, more than one staff could be included in the observation. Staff data were not specific to a particular staff, but instead, those data were scored if any staff provided interaction or choices to a specific consumer. Consumers were included in the observation (up to four maximum) if they were present in the common areas at the beginning of the observation period. If a home or program had more than four consumers present,

observers picked which four to include in the observation. However, for the interval to count, the consumer had to be present for more than half of the interval (1.5 min). Staff delivery of *positive interactions for engagement* was defined as staff providing a positive comment to a particular consumer regarding appropriate engagement with an item or activity such as "That looks like an interesting book, John!" Staff delivery of p*rompts with a choice* was defined as staff physically presenting and/or vocally offering at least two item or activity options such as, "Would you like to read a magazine, or listen to music?" Questions about activity engagement that did not involve providing a choice (e.g., "what do you want to do next?") were not scored as prompts with choice. Consumer *activity engagement* was defined as the consumer attending to, looking at, or manipulating an item in the manner in which it was intended. This included looking at the TV, swinging on a swing in the yard, or turning the pages while looking at a magazine. This did not include engaging in problem behavior such as repetitive behavior while holding an item (e.g., flapping their hands while holding a magazine).

We analyzed the main dependent variables, which were the percentage of 3-min intervals of consumer activity engagement, staff prompts with choice, and staff positive interactions for engagement. The percentage of intervals of consumer activity engagement was calculated by dividing the number of intervals across consumers present in which consumers were engaged by the total number of intervals across consumers present. For example, if there were four consumers present for all 3-min intervals (18 intervals), and of those intervals, consumers were engaged with items or activities for 15 of 18 of those intervals, researchers divided 15 by 18 to get a percentage of 83.3% consumer activity engagement. The percentage of intervals of staff providing prompts with choice was calculated by dividing the number of intervals across consumers present in which staff provided prompts with choice by the total

number of intervals across consumers present. For example, if there were three consumers present for all 3-min intervals (15 intervals), and of those intervals, the staff provided prompts with choice for 13 of those intervals, we divided 13 by 15 to get a percentage of 86.7% prompts with choice. The percentage of intervals of staff providing positive interactions for engagement was calculated by dividing the number of intervals across consumers present in which staff provided positive interactions for engagement by the total number of intervals across consumers present. For example, if there was one consumer present for all 3-min intervals (5 intervals), and of those intervals, the staff provided positive interactions for engagement for 3 of those intervals, we divided 3 by 5 to get a percentage of 60% positive interactions for engagement.

A second independent observer collected data for at least 22% of observations across all phases and programs in order to determine IOA. An interval-by-interval agreement method across staff behavior (i.e., positive interactions for engagement; prompt with choice) and consumer behavior (i.e., activity engagement) was used. An agreement was scored if both observers agreed whether a particular type of staff behavior or consumer behavior occurred in an interval. IOA was calculated by dividing the number of agreement intervals for each staff and consumer behavior by the total number of intervals and multiplying by 100%. Overall, IOA for an observation session was calculated by averaging IOA scores for the different staff behaviors (prompt with choice; positive interactions for engagement) and consumer behavior (activity engagement). For home E-1, mean IOA was 95% (range: 87 - 100%). For home W-1, mean IOA was 99% (range: 96 - 100%). For program D-1, mean IOA was 98% (range: 93 - 100%). For home F-9, mean IOA was 95% (range: 86 - 100%). For home F-12, mean IOA was 91% (range: 80 - 100%). For program D-2, mean IOA was 93% (range: 67 - 100%). For home F-3, mean IOA was 91% (range: 66 - 100%). For home F-2, mean IOA was 96% (range: 87 - 100%).

For home F-6, mean IOA was 97% (range: 87 - 100%). For home P-1, mean IOA was 93% (range: 85 - 100%). For home T-1, mean IOA was 95% (range: 85 - 100%). For home F-17, mean IOA was 92% (range: 83 - 100%). For home C-1, mean IOA was 99% (range: 98 - 100%). For home L-4, mean IOA was 95% (range: 90 - 100%). For home L-5, mean IOA was 93% (range: 87 - 100%). For home G-1, mean IOA was 93% (range: 85 - 100%). For program D-3, mean IOA was 94% (range: 90 - 97%). For home O-1, mean IOA was 99% (range: 98 - 100%). All IOA scores under 80% were immediately followed by data collector retraining on the behavioral definitions.

General Procedures

We evaluated the effects of BST and OJF (Parsons et al., 2012; Van Oorsouw et al., 2009) for increasing staff healthy behavioral practices, which we derived from the FBA and function-based intervention literature (Beavers et al., 2013; Hagopian et al., 2013) as well as the active treatment literature for adults with IDD (e.g., Parsons et al., 2004; Realon et al., 2002). These practices included (a) provide positive interactions, (b) provide effective instructions, (c) respond correctly to problem behavior, and (d) promote consumer engagement. Training staff on providing positive interactions was based on active treatment literature (e.g., Zoder-Martell et al., 2014) that involved training staff this skill. In addition, attention is a common function of problem behavior (Beavers et al., 2013). Thus, function-based interventions for reducing attention-maintained problem behavior and increasing appropriate behavior to access attention include the noncontingent delivery of attention (e.g., Hagopian et al., 1994; Kahng et al., 2000) or providing attention contingent on the occurrence of an appropriate behavior (i.e., DRA; e.g., Hanley et al., 2001; Rehfeldt & Chambers, 2003). Training staff on providing effective instructions was based on active support literature suggesting the provision of simple instructions

and prompts to occasion appropriate behavior are effective ways to increase the likelihood of compliance (Geiger et al., 2010). Furthermore, a common function of problem behavior is escape from aversive situations (e.g., instruction or task contexts; Fisher & Bouxsein, 2011). Thus, function-based interventions have included providing various prompts to increase compliance (e.g., Ebanks & Fisher, 2003; McComas et al., 2000), providing "do" rather than "don't" requests (e.g., Adelinis & Hagopian, 1999), and delivering instructions in a pleasant and clear manner. Training staff on providing correct responses to problem behavior was based on the function-based treatment literature suggesting that no longer providing attention and access to preferred items and activities contingent upon problem behavior is effective for decreasing problem behavior maintained by social positive reinforcement (EXT; Fisher & Bouxsein, 2011; Hagopian et al., 2013), particularly when used in conjunction with reinforcement procedures (Hagopian et al., 1998; Zarcone et al., 1993). Finally, training staff on promoting consumer engagement was based on active treatment research that suggests the importance of access to preferred leisure items and choice opportunities for enhancing the quality of life for adults with IDD (e.g., Parsons et al., 2004; Salmento & Bambara, 2000). In addition, function-based treatment research suggests environmental enrichment (i.e., providing access to a variety of preferred items and activities; Horner, 1980) and choice opportunities may decrease the occurrence of problem behavior maintained by access to social positive reinforcement in the form of attention and preferred items and activities, as well as compete with the occurrence of automatically reinforced problem behavior (Gover et al., 2019).

For each healthy behavioral practice, we conducted baseline observations, initial training (BST), and then observations with OJF separately for each practice in the following order: provide positive interactions, provide effective instructions, respond correctly to problem

behavior, and promote consumer engagement. Thus, a new baseline, training, and observations with OJF for a particular healthy behavioral practice did not begin until all sessions were completed for a previous healthy behavioral practice. This was done because of the large number of homes and programs in which the intervention was implemented and the eight consultants that needed to be trained to implement the training, observations and feedback systematic fashion. Each consultant maintained written records of the names of trained staff to determine which staff to train and which staff to observe and provide feedback.

The evaluation for each healthy behavioral practice was conducted using an AB design across the homes and programs; however, within the context of the evaluation, several naturalistic nonconcurrent multiple baselines across homes, programs, and practices provided additional experimental control and confidence in the effects of BST + OJF for behavior change. It is important to note that we did not program for multiple baselines for various reasons. First, within a practice, we implemented training at the same time for all homes and programs because various staff worked across homes and programs. Thus, if we had implemented the intervention in some homes but not others, a confound may have been that staff trained in one home or program may have substituted in another home or program in which the intervention had not yet been implemented. Second, across practices, our group of consultants were responsible for implementing behavior change procedures as quickly as possible to influence staff behavior; thus, long baselines would have been problematic from a clinical perspective.

We also conducted statistical analyses of our data using simulation model analyses (SMA; Borckardt, Nash, Balliet, Galloway, & Madan, 2013; Borckartdt et al., 2008) and compared the outcomes to visual-analysis outcomes. We conducted these statistical analyses as an additional measure of our intervention effects given that we used AB designs to evaluate the

effects of our intervention on staff and consumer behavior across the large number of programs. Overall, SMA allows clinical researchers to determine the statistical significance of single-subject outcomes. That is, SMA determines the likelihood of obtaining the outcomes of a single-subject data set if a random data set of the same length and autocorrelation was randomly selected from a large *N*-study (i.e., $N = 5000$; Borckardt et al., 2013). Therefore, SMA translates single-case data into analyses that are typically conducted for group studies, which are largely accepted and used in social-science research (see Borckardt et al., 2013 and Borckartdt et al., 2008 for further reading on using SMA to determine the statistical significant of single-case data). For the current study, SMA was used only to evaluate the change in level of the main dependent variables across all practices (i.e., overall positive interactions, staff effective instructions, staff correct responses to problem behavior, and consumer engagement) across baseline and intervention phases. However, SMA can also be used to evaluate the slope and trend of AB data sets. We used level to evaluate the statistical significance of our outcomes in the current study because it was the most sensitive to detecting changes behavior across pre-training and post-training phases. That is, if the intervention is effective, then the level of the dependent variable should increase from pre- to post-training phases. To determine the level of significance of our data, we used the *p* value of less than or equal to 0.05; however, we will also discuss our data when a *p* value of less than or equal to 0.1 is considered. We compared visual-analysis outcomes of our intervention to SMA outcomes by determining whether (a) visual analysis outcomes and SMA outcomes both suggest an effect (i.e., true positive); (b) visual analysis outcomes and SMA outcomes both suggest no effect (i.e., true negative); (c) visual analysis outcomes suggest an effect, whereas SMA outcomes suggest no effect (i.e., false negative); and (d) visual analysis outcomes suggest no effect, whereas SMA outcomes suggest

an effect (i.e., false positive). We did not compare SMA outcomes for data sets for which visual analysis outcomes showed unclear effects (i.e., not applicable [NA]). That is, we conducted SMA analyses for all data sets; however, for some data sets, if visual analyses suggested unclear effects, we could not compare outcomes when SMA outcomes and visual analysis outcomes are compared.

Baseline. During baseline for each healthy behavioral practice, consultants and data collectors went to the home or program to conduct 15-min observations and collected data using the checklist (Appendices A - D) for that practice. The observations were not scheduled per se; however, the consultants worked with the home coaches and other supervisory staff to determine days/times in which staff and consumers would be present in the homes or programs. Prior to baseline observations, the consultant informed staff that that they were going to conduct a 15-min observation and informed staff to continue doing their work as they usually would. Following baseline observations, the consultant thanked the staff but provided no programmed consequences for their behavior.

BST and OJF. Once baseline observations were completed for a healthy behavioral practice, the consultant began training staff in the home or program on that healthy behavioral practice using BST and also began conducting post-training observations, in which the consultant observed trained staff on-the-job and provided feedback on staff performance using an on-the-job feedback protocol specific to each healthy behavioral practice (see the back of each checklist in Appendices A, B, C, and D for the on-the-job feedback protocol). All consultants were trained on each healthy behavioral practice, the implementation of BST for that practice, and the delivery of OJF for that practice by Ph.D.-level behavioral consultants.

Initial training involved using BST to train each healthy behavioral practice, which included training individual staff on the implementation of the practice using instructions, modeling, role play, and feedback. Specifically, for each practice, the staff were instructed on the healthy behavioral practice by the consultant who reviewed a PowerPoint presentation specific to that practice. The presentation included (a) a brief description of the practice, (a) how to implement the practice (with video examples), (c) when to implement the practice, and (d) why it is important to implement the practice. Each PowerPoint presentation was scripted to increase the likelihood of uniform training across consultants and staff. After reviewing the presentation, the consultant modeled the practice, then had the staff rehearse the practice with the staff playing themselves and the consultant playing the role of a consumer. The consultant then provided positive feedback for correct implementation of the practice and corrective feedback for incorrect implementation of the practice during rehearsal until the staff displayed correct implementation of the practice.

On-the-job observations and feedback sessions were conducted after the staff had experienced BST on a practice. These observations were conducted similar to baseline observations, except that after the observation, the consultant immediately provided target staff (one or more, depending on the practice) on-the-job feedback in a quiet area of the home using an on-the-job feedback protocol created for that practice (see Appendices A - D). Generally, on-the-job feedback included the same steps that were tailored to feedback for a specific practice. First, the doctoral student consultants reviewed the checklist outcomes for the healthy behavioral practice with the target staff (ensuring to show the checklist to staff as they were reviewing). Next, the consultant provided staff with behavior-specific praise for correct implementation of the practice and corrective feedback for incorrect implementation of the practice. Consultants

were trained to use a supportive voice tone and facial expression (e.g., refrain from reprimanding staff, yelling at staff, or frowning at staff) to provide corrective feedback. If applicable, the consultant also described how staff could improve implementation of the practice in the future, then implemented BST. That is, the consultant modeled the practice, had the staff role play the practice with the consultant or with consumers that were present (if feasible), and provided feedback until the staff correctly implemented the practice. Finally, consultants answered any questions or clarified any procedures based on staff inquiries. The on-the-job feedback protocol for each healthy behavioral practice was on the back of the data sheet for that practice (see the back page of Appendices A, B, C, and D for the feedback protocol for each practice) and was tailored to be a checklist for the consultant to follow to ensure they implemented the feedback correctly. Below is a description of BST and on-the-job feedback implemented for each healthy behavioral practice.

Positive interactions. Because providing positive interactions was the first practice we trained, the PowerPoint for this practice also included an introduction to problem behavior, common reasons why individuals might engage in problem behavior, and a list of the four healthy behavioral practices (see Appendix E, slides 1-3). After the consultant reviewed this information, they began the PowerPoint training on positive interactions (named "Provide Positive Interactions" in the PowerPoint slides [see Appendix E, slides 4-12]). This presentation included training on providing positive interactions at least once in every 5 min to consumers, examples of the different types of positive interactions including descriptive praise for appropriate behavior, and a discussion on why implementing positive interactions was important (i.e., to promote healthy relationships, decrease problem behavior, and increase appropriate behavior).

On-the-job feedback (see second page of Appendix A) for positive interactions included providing praise for staff's positive interactions with consumers (across consumers and intervals) and providing staff with corrective feedback regarding intervals in which they did not provide positive interactions to a consumer present. Furthermore, consultants modeled correct types of positive interactions and had the staff rehearse how to correctly provide positive interactions. For example, the consultant might have shown the staff how to correctly provide conversation, compliments, and descriptive praise, which were types of interactions that were incorrect or did not occur during the observation. Next, they might have asked the staff to show them how to implement positive interactions correctly either with the consultant playing the role of the consumer or with present consumers.

Effective Instructions. Training on effective instructions began with reviewing the PowerPoint for this practice (named "Provide Effective Instructions" in the PowerPoint slides [see Appendix E, slides 15-18]). This presentation included training on how to deliver effective instructions including (a) using a pleasant voice tone and facial expression, (b) presenting instructions using simple and clear demands (e.g., breaking down demands into smaller steps), (c) using "do" rather "don't" requests, and (d) using two-step prompting (i.e., tell and show), as well as providing help when necessary. The presentation also included training to provide effective instructions during any instructional, task, or chore context throughout the day. Finally, the presentation included a review of why providing consumers with effective instructions is important (i.e., to decrease task difficulty, increase compliance, and decrease problem behavior in instructional contexts).

On-the-job feedback (see the second page of Appendix B) for effective instructions included providing praise to staff for providing correct instructions and providing staff with

corrective feedback on instructions that were not delivered correctly (e.g., staff provided a "don't" rather than a "do" request). Furthermore, consultants modeled correct types of instructions and had the staff rehearse. For example, the consultant might have shown the staff how to correctly provide an instruction that was delivered incorrectly during the observation. Next, they might ask the staff to show them how to provide the correct instruction either with them playing the role of the consumer or with present consumers.

Correct Responses to Problem Behavior. Prior to training this practice (during the baseline data-collection period), we reviewed all behavior plans of consumers in each program to ensure that consultants assigned to each program were aware of any procedures that may be contradictory to the content trained in this practice (e.g., behavior plans directing staff to deliver attention following severe problem behavior). Behavior plan review outcomes showed that six programs (i.e., F-9, W-1, E-1, D-2, F-2, and F-3) had at least one behavior plan that contained procedures that involved the delivery of attention for problem behavior and were thus contradictory to the training. Therefore, in consultation with administration and home or program clinical teams, the consultants worked to change the behavior plans to be in line with our training on how to respond to problem behavior (i.e., no longer provide attention immediately following severe problem behavior). This change to these behavior plans occurred prior to our training phase. Therefore, for these 6 homes, baseline data in this phase may have been influenced by behavior plans that instructed staff to provide attention following severe problem behavior, and post-training data may have been influenced by the change in the behavior plan to be in line with healthy behavioral practices in addition to the independent variable (BST + OJF). Thus, for these six programs, the outcomes of our intervention should be interpreted with this consideration.

Training on correct responding to problem behavior began with reviewing the PowerPoint for this practice (named "Good practices following problem behavior" in the PowerPoint slides [see Appendix E, slides 19-21]). This presentation included training on what constituted minor disruptive behavior and severe problem behavior. In addition, it included training on not commenting on minor disruptive behavior but included explanation that other interactions (e.g., providing choices) following these behaviors were acceptable. Furthermore, it included training on not commenting on severe problem behavior at any point in time and withholding attention and access to preferred items and activities for at least 10 s without the occurrence of severe problem behavior. However, staff were informed that if physical intervention was necessary for consumer safety (e.g., blocking), they were to implement it with the minimal attention (e.g., no eye contact and no talking to the consumer). Finally, staff were trained to provide high-quality attention (i.e., positive interactions) and access to preferred items and activities when severe problem behavior was not occurring.

On-the-job feedback (see the second page of Appendix C) for correct responding to problem behavior included providing praise to staff for correctly responding to problem behavior (minor disruptive and severe) and correctly providing high-quality interactions. In addition, it involved providing staff with corrective feedback for incorrect responses to problem behavior (e.g., staff provides a reprimand immediately following severe problem behavior such as physical aggression) or missed opportunities to deliver high-quality interactions. Furthermore, consultants modeled correct responses to problem behavior and high-quality interactions and had the staff rehearse. For example, the consultant might have shown the staff how to correctly respond to a problem behavior that resulted in an incorrect response during the observation.

Next, they might have asked the staff to show them how to respond to the problem behavior correctly with the consultant playing the role of the consumer.

Consumer engagement. During our informal observations in many of the homes and in baseline observations for this practice, we observed a lack of items and activities in the common areas with which consumers could engage. Furthermore, we observed that the items and activities that were present may not have been preferred by consumers or were not in usable condition (e.g., electronics missing batteries, broken items). Therefore, after baseline and before our intervention phase, the consultants conducted formal staff and consumer interviews to determine items and activities that would be preferred by consumers in the homes using the Reinforcer Inventory for Adults (Behavior Assessment Guide, 1993). This inventory is a questionnaire used to rank the preference of various stimuli and activities such as entertainment materials (e.g., radio), arts and crafts (e.g., building clay models), excursions (e.g., picnics), and sensory items (e.g., noise-maker instruments or rocking). During the interview, the interviewee (staff or consumer) was asked to rank the level of consumers' preference for specific stimuli (e.g., puzzles) and activities (e.g., playing card games) using a five-level scale (not at all, a little, a fair amount, much, and very much). Items purchased for each program were generated from the list of items identified by staff as consumers to be under the *very much* category, as those items were likely to be the most preferred by consumers. After these interviews were conducted, the consultants worked with administration and home coaches/supervisors to purchase new items and activities (e.g., books, puzzles, movies, music, manipulative materials) for each home based on the list of potential preferred items and activities. Furthermore, the consultants worked with home coaches/supervisors to purchase cabinets or bins in which these items could be kept in the common areas of the homes such that consumers had ongoing access to them. Therefore, part of

the intervention for these homes included environmental enrichment (EE; Horner, 1980) in which access to preferred items activities was made available in the common areas of the home. Additional items and activities were not purchased for the three day programs because observations suggested there was a large variety of items and activities available and in good condition in these programs.

We began training and observations consumer engagement once new items and activities had been purchased for relevant homes. It is important to note that the purchasing process took a while for administration to coordinate; thus, the evaluation of this healthy behavioral practice was delayed to the final practice trained (even though we collected the initial baseline data as the second healthy behavioral practice). Initial training included reviewing the PowerPoint on promoting consumer engagement (named "Provide access to preferred items/activities" in the PowerPoint slides [see Appendix E, slides 12-14]). This presentation included training on providing consumers with choices of preferred things to do throughout the day, particularly during leisure periods or when staff were occupied with other tasks within the home and programs. The presentation also included a discussion of why providing consumers with choices to preferred items and activities is important (i.e., to promote healthy relationships and decrease problem behavior).

On-the-job feedback (see second page of Appendix D) for consumer engagement included providing feedback to all staff involved in the observation (i.e., it could be multiple staff). This included providing praise to staff for intervals in which consumers were engaged, intervals in which staff provided positive interactions about engagement, and intervals in which staff prompted consumer engagement with a choice. This also included providing corrective feedback for intervals in which consumers were not engaged and staff did not provide prompts

with a choice to promote engagement. Furthermore, consultants modeled correct types of interactions for engagement when consumers were engaged (e.g., "Great job with that puzzle!") and for providing consumers with prompts with choices to engage and had staff rehearse how to correctly implement these procedures. For example, the consultant might have shows staff how to correctly provide prompts with choices, which might not have occurred or occurred incorrectly during the observation. Next, the consultant might have asked the staff to show them how to provide prompts with choices correctly either with them playing the role of the consumer or with present consumers.

Results

Healthy Behavioral Practices (All Homes and Programs)

Data for the main dependent variables (as discussed in the dependent variables section above) are depicted for all healthy behavioral practices across all homes and programs in Figures 1 - 12. Specifically, Figures 1 - 3 depict positive interactions data, Figures 4 - 6 depict effective instructions data, Figures 7 - 9 depict correct response to problem behavior data, and Figures 10 - 12 depict consumer engagement data.

Furthermore, we conducted statistical analyses of our data using SMA (e.g., Borckartdt et al., 2008) and compared the outcomes to visual-analysis outcomes. All SMA outcomes relative to visual analysis outcomes are depicted in Tables 1 - 4. Specifically, Table 1 depicts SMA outcomes for overall positive interactions, Table 2 depicts SMA outcomes for effective instructions, Table 3 depicts SMA outcomes for staff correct responses to problem behavior, and Table 4 depicts SMA outcomes for consumer engagement.

We also determined means for each phase in each of the evaluations and calculated mean percentage changes for data collected for each healthy behavioral practice from baseline to

post-training (BST + OJF), which are depicted in Tables 5 - 8. Specifically, Table 5 depicts the mean percentage change of intervals for overall staff positive interactions from baseline to post-training; Table 6 depicts the mean percentage change of staff correct instructions from baseline to post-training; Table 7 depicts the mean percentage change of intervals for staff correct responses to problem behavior and staff providing correct high-quality interactions from baseline to post-training; Table 8 depicts the mean percentage changes of intervals for staff providing prompts with choice, consumer engagement with items and activities, and staff providing consumers with positive interactions for engagement from baseline to post-training.

Next, for positive interactions and effective instructions, we determined the mean percentage intervals of each interaction type (e.g., conversation and praise) and the mean percent correct of each instruction element (e.g., tell/show instruction) in baseline and BST + OJF and aggregated pre- and post-training levels across all homes and programs. These aggregated means across phases are depicted in Figures 13 - 14. Specifically, Figure 13 depicts aggregated pre- and post-mean percentage intervals of different interactions types in baseline and BST + OJF; Figure 14 depicts the aggregated pre- and post-mean percentage correct of different instruction elements in baseline and BST + OJF. Furthermore, all pre- and post-means of the different positive interactions and effective instructions elements for individual homes and programs are depicted in Tables 9 - 10. Specifically, Table 9 depicts the mean percentage intervals of positive interactions types in baseline and BST + OJF for each home and program; Table 10 depicts the percentage mean of each instruction element in baseline and BST + OJF.

Positive interactions. Figures 1- 3 depict data for the percentage of intervals of overall positive interactions for all homes and programs. Figure 1 depicts data for seven homes and programs (D-1, G-1, W-1, T-1, O-1, D-3, and E-1) that showed relatively low but variable levels

of positive interactions in baseline but higher and in some cases more stable levels in the BST + OJF phase. However, for G-1, T-1, and E-1, initial high levels became more variable over time. Figure 2 depicts data for six homes and programs (I-7, C-1, P-1, D-2, L-5, F-17) that showed an increase in level, stability, or both from baseline to the BST + OJF phase. Specifically, I-7, C-1, and L-5 showed an increasing trend in baseline; however, levels in BST + OJF are higher and more stable. In addition, P-1 and D-2 show relatively high levels of positive interactions in baseline; however, levels are slightly higher and more stable, at least toward the end of the phase in BST + OJF. Finally, F-17 shows high levels initially in baseline that decrease to zero levels; however, high and maintained levels occur in BST + OJF. Figure 3 depicts data for the remaining six homes and programs (L-4, F-12, F-6, F-2, F-3, F-9) that showed no clear difference between baseline and BST + OJF; however, responding either occurred at very high levels in baseline (L-4, F-12, F-6, F9) or relatively high but variable levels in baseline (F-2 and F-3).

Table 1 depicts SMA outcomes for overall positive interactions for all 19 homes and programs whose graphs are depicted in Figures 1 - 3. Overall, given the *p* value equal to or less than 0.05, SMA outcomes yielded four true positive outcomes (G-1, T-1, O-1, and D-3 in Figure 1), three false negative outcomes (D-1, W-1, and E-1 in Figure 1), and six true negative outcomes (L-4, F-12, F-6, F-2, F-3, and F-9 in Figure 3). Visual analyses showed unclear effects for six homes and programs (L-7, C-1, P-1, D-2, L-5, and F-17 in Figure 2); thus, we could not compare outcomes to SMA outcomes for these homes and programs. Given the *p* value equal to or less than 0.1, the number of true positive outcomes increases from four (G-1, T-1, O-1, and D-3 in Figure 1) to seven (D-1 in Figure 1; C-1 and L-5 in Figure 2 would be included).

Table 5 depicts the mean percentages of intervals in which staff engaged in overall positive interactions in baseline and BST + OJF phases, as well as the percentage mean change in percentages of intervals of overall positive interactions from baseline to BST + OJF. Overall, results suggest staff in 17 of 19 programs increased positive interactions and two programs decreased positive interactions. However, for the two programs that had a decreased percentage mean change (L-4 and F-2), positive interactions were already high in baseline.

Figure 13 depicts the aggregated mean percentages of intervals in which staff from all 19 homes and programs engaged in each of the different types of positive interactions in baseline and BST + OJF. Overall all six types of positive interactions increased from baseline to BST + OJF with conversation, appropriate physical interaction, expression of care, and praise resulting in the most robust increase and compliment and greet resulting in the least robust increase. More specifically; compliment increased from a mean interval of 0.5% (range: 0 - 3%) in baseline to 4.3% (range: 0 - 13%) in BST + OJF; conversation increased from a mean interval of 42% (range: 19 - 83%) in baseline to 59% (range: 39 - 86%) in BST + OJF; greet increased from a mean interval of 7% (range: 0 - 48%) in baseline to 9% (range: 0 - 27%) in BST + OJF; appropriate physical interaction increased from a mean interval of 6% (range: 0 - 16%) in baseline to 17% (range: 0 - 37%) in BST + OJF; expression of care increased from a mean interval of 12% (range: 0 - 38%) in baseline to 30% (range: 13 - 48%) in BST + OJF; praise increased from a mean interval of 13% (range: 0 - 38%) in baseline to 25% (range: 9 - 51%) in BST + OJF. Mean percent intervals of the different types of positive interactions for each home and program are depicted in Table 9, which shows an increase in most interaction types from baseline to BST + OJF.

Effective instructions. Figures 4 - 6 depict data for the percentage of correct staff instructions for all homes and programs. The numbers on top of the data points depict the number of instructions provided in that particular observation. The asterisks on the bottom of each graph depict observations in which staff did not deliver any instructions. Figure 4 depicts the data for nine homes and programs (G-1, L-4, C-1, E-1, W-1, D-2, O-1, D-1, and D-3) that showed low, variable, or a consistently decreasing percentage of correct staff instructions in baseline but higher and consistently more stable levels in BST + OJF. Figures 5 and 6 depict data for nine homes and programs (F-9, F-17, F-12, F-2, and F-3 in Figure 5; F-6, P-1, T-1, and L-5, in Figure 6) that showed relatively high levels or increasing and high levels of correct staff instructions in baseline that maintained at similar high levels in BST + OJF.

Table 2 depicts SMA outcomes for staff effective instructions for all 18 homes and programs whose graphs are depicted in Figures 4 - 6. Overall, given the *p* value equal to or less than 0.05, SMA outcomes yielded seven true positive outcomes (G-1, L-4, C-1, E-1, W-1, D-1, and D-3 in Figure 4), two false negative outcomes (D-2 and O-1 in Figure 4), and nine true negative outcomes (F-9, F-17, F-12, F-2 and F-3 in Figure 5; F-6, P-1, T-1, and L-5 in Figure 6). Given the *p* value equal to or less than 0.1, the number of true positive outcomes increases from seven (G-1, L-4, C-1, E-1, W-1, D-1, and D-3 in Figure 4) to nine (D-2 and O-1 in Figure 4)

Table 6 depicts the mean percentages of staff effective instructions in baseline and BST + OJF phases, as well as the percentage mean change in percentages of effective instructions from baseline to BST + OJF. Overall, results suggest staff in 16 of 18 programs increased the mean percentage of effective instructions; however, some changes were more robust than others. Furthermore, staff in 2 of 18 programs (F-3 and F-6) decreased effective instructions; however,

for these two programs, decreases were small and effective instructions were already high in baseline.

Figure 14 depicts the aggregated mean percentages of staff correct instructions from all 18 homes and programs in baseline and BST + OJF. Overall, simple and clear instructions and "do" requests were already occurring at high mean levels in baseline and continued to occur at similar levels in BST + OJF. Therefore, given these high levels in baseline, increases for these two instruction elements were not robust. Results for tell/show instructions showed moderate levels of mean percent correct in baseline that increased to high levels in BST + OJF. More specifically; simple and clear instructions increased from a mean percent correct of 98% (range: 87 - 100%) in baseline to 99% (range: 99 - 100%) in BST + OJF; "do" requests increased from a mean percent correct of 91% (range: 75 - 100%) in baseline to 95% (range: 85 - 100%) in BST + OJF; tell/show instructions increased from a mean percent correct of 69% (range: 22 - 100%) in baseline to 97% (range: 89 - 100%) in BST + OJF. The mean percent correct of the different effective instruction elements for each home and program are depicted in Table 10, which shows maintenance of high levels of simple and clear instructions from baseline to BST + OJF for most programs, an increase in "do" requests from baseline to BST + OJF for most programs, and an increase of tell/show instructions from baseline to BST + OJF for most programs.

Responding to problem behavior. Figures 7 - 9 depict data for the percentage of intervals of correct responses to problem behavior (both minor disruptive and severe problem behavior) and percentage of intervals of correct delivery of high-quality interactions (i.e., high-quality interactions for the absence of problem behavior). Figures 7 and 8 depict data from 11 homes and programs (F-17, E-1, W-1, O-1, and T-1 in Figure 7; D-1, F-2, P-1, D-2, F-9, F-12 in Figure 8) that show low or decreasing percent intervals of staff correct responses to problem

behavior during baseline and high and stable percent intervals of staff correct responses to problem behavior during BST + OJF. However, data for F-12 are unclear given the few observations in both baseline and BST + OJF. Figure 9 depicts data from six homes and programs (L-4, G-1, F-6, L-5, D-3, F-3) that showed similar levels of staff correct responses to problem behavior across baseline and BST + OJF (i.e., either high but variables levels across phases or high and stable levels across phases). Data for high-quality interactions show no clear effects across baseline and BST + OJF for six programs (W-1 in Figure 7; F-9 and F-12 in Figure 8; G-1, L-5, and D-3 in Figure 9). That is, for these programs, high-quality interactions were either high in baseline and continued to be high in BST + OJF or were variable in baseline and continued to be variable in BST + OJF. Ten programs (F-17, E-1, and T-1 in Figure 7; D-1, F-2, P-1, and D-2 in Figure 8; L-4, F-6, and F-3 in Figure 9) show an increase in high-quality interactions from baseline to BST + OJF. One program (O-1 in Figure 7) showed a decrease in high-quality interactions from baseline to BST + OJF.

Table 3 depicts SMA outcomes for staff correct responses to problem behavior for all 17 homes and programs whose graphs are depicted in Figures 7 - 9. Overall, given a *p* value equal to or less than 0.05, SMA outcomes yielded five true positive outcomes (F-17 in Figure 7; D-1, P-1, D-2, and F-9 in Figure 8), six false negative outcomes (E-1, W-1, O-1, T-1 in Figure 7; F-2 and F-12 in Figure 8), and six true negative outcomes (L-4, G-1, G-6, L-5, D-3, and F-3 in Figure 9). Given a *p* value equal or less than 0.1, the number of true positive outcomes increases from five (F-17 in Figure 7; D-1, P-1, D-2, and F-9 in Figure 8) to eight (E-1 and T-1 in Figure 7; F-2 in Figure 8 would be included).

Table 7 depicts the mean percentages of intervals of staff correct responses to problem behavior and percentage of intervals of staff correct delivery of high-quality interactions across

baseline and BST + OJF phases, as well as the percentage mean change in percentage of intervals of these data from baseline to BST + OJF. Overall, results suggest staff in 15 of 17 programs increased mean correct responses to problem behavior, whereas staff from 2 of 17 programs (D-3 and F-3) decreased mean correct responses to problem behavior. However, for the latter two programs, correct responses to problem behavior were already high in baseline. Additionally, results suggest that staff in 16 of 17 programs increased mean high-quality interactions, whereas staff from one program (O-1) decreased mean high-quality interactions. However, as mentioned above for the latter program, high-quality interactions were already high in baseline.

Consumer engagement. Figures 10 - 12 depict data for consumer engagement (i.e., percent intervals of staff prompt with choice, percent intervals of consumer engagement, and percent intervals of staff positive interactions for consumer engagement). Figures 10 and 11 depict data from 12 homes or programs (D-1, F-9, W-1, E-1, L-4, and F-17 in Figure 10; L-5, O-1, P-1, C-1, F-3, and T-1 in Figure 11) that show increases in percent intervals of consumer engagement from baseline to BST + OJF (and for some homes the addition of EE in which new items and activities were provided in these homes); however, for some homes and programs only a few observations occurred in the intervention phase. Figure 12 depicts data from six homes and programs (G-1, D-3, F-2, F-12, F-6, D-2) who did not show as robust results. Specifically, percent consumer engagement for most of these programs showed high or increasing levels of consumer engagement in baseline; however, those levels either stabilized at high levels following the intervention (D-3 and D-2) or maintained at high levels following the intervention (G-1, F-2, F-12). The only exception was for F-6 that showed lower levels following the intervention as compared to baseline. Data from these homes and programs showed little change

in staff prompts with choices from baseline to BST + OJF (and for some, EE). However, given that consumer engagement in most programs was high in BST +OJF phases, it may not have been necessary for staff to provide prompts with choices to already engaged consumers. Furthermore, data for staff interactions for engagement suggest that staff in 13 of 18 programs (D-1, L-4, and F-17 in Figure 10; L-5, 0-1, P-1, C-1, F-3, and T-1 in Figure 11; D-3, F-2, F-6, and D-2 in Figure 12) increased positive interactions for engagement from baseline to BST + OJF (and for some, EE). However, increased levels across most programs were not robust, potentially because these interactions only pertained to engagement and staff may have been providing other types of interactions. Data from five homes/programs (F-9, W-1, and E-1 in Figure 10; G-1 and F-12 in Figure 12) show no clear differences in staff interactions for engagement from baseline to BST + OJF (and EE for some).

Table 4 depicts SMA outcomes for consumer engagement for all 18 homes and programs whose graphs are depicted in Figures 10 - 12. Overall, given a *p* value equal to or less than 0.05, SMA outcomes yielded 10 true positive outcomes (D-1, F-9, E-1, L-4 in Figure 10; L-5, O-1, P-1, C-1, F-3, and T-1 in Figure 11), two false negative outcomes (W-1 and F-17 in Figure 10), and six true negative outcomes (G-1, D-3, F-2, F-12, F-6, and D-2 in Figure 12). Given a *p* value equal or less than 0.1, the number of true positive outcomes would stay the same.

Table 8 depicts the mean percentages of intervals in which staff provided prompts with choice, consumers engaged with items and activities, and staff provided positive interactions for consumer engagement across baseline and post-training phases, as well as the percentage mean change in percentage of intervals of these data from baseline to BST + OJF. Overall, results suggest staff in 12 of 18 programs increased mean prompts with choice. However, the

percentage change of intervals with staff prompts with choice that resulted in increases were very small (range: 2% to 33%) from already very low baselines (range: 0% to 16%). Additionally, results suggest consumers from 17 of 18 homes and programs increased mean levels of engagement, whereas only 1 of 18 homes or programs (F-6) decreased mean levels of engagement. However, engagement levels in baseline in the program were already very high. Finally, results suggest that staff from 17 of 18 programs increased mean levels of positive interactions for engagement, whereas staff from only 1 of 18 programs (W-1) decreased mean levels of positive interactions for engagement. For the latter program, the decrease was small (1%) from an already low baseline (7%).

Healthy Behavioral Practices (Applicable Individual Staff)

We conducted additional analyses for applicable individual staff for the first three practices in addition to the analyses described above. That is, for positive interactions, effective instructions, and correct responses to problem behavior, we conducted two analyses of individual staff performance for applicable staff. We did not conduct these analyses for consumer engagement because more than one staff could be observed in a single observation. First, we conducted a pre-post comparison of staff mean performance in baseline and BST + OJF phases, which are depicted in Figures 15 - 17. Staff were included in this analysis if they had at least one baseline session and one post-training session. Specifically, Figure 15 depicts pre-post mean percentage intervals of overall positive interactions for applicable individual staff, Figure 16 depicts pre-post mean percentages of correct instructions for applicable individual staff, and Figure 17 depicts pre-post mean percent intervals of correct responses to problem behavior for applicable individual staff. Second, we compared the mean performance in baseline, in the first observation following initial training (BST), and in subsequent observations following on-the-

job feedback (BST + OJF) for applicable staff, which are depicted in Figures 18 - 25. Staff were included in this analysis if they had at least one baseline session and two post-training sessions. Specifically, Figures 18 - 20 depict mean performances for applicable individual staff in baseline, BST, and BST + OJF for positive interactions; Figures 21 - 23 depict mean performances for applicable individual staff in baseline, BST, and BST + OJF for effective instructions; and Figures 24 - 25 depict mean performances for applicable individual staff in baseline, BST, and BST + OJF for correct responses to problem behavior.

Pre-post performance (individual staff). Figure 15 depicts two panels of pre-post mean percentage intervals of overall positive interactions for 36 staff from 19 homes and programs. Overall, 25 staff increased positive interactions from baseline to BST + OJF. The mean increase for these 25 staff was 46% (range: 8 - 100%). Furthermore, five staff (Alexandra in first panel; Libby, Rogelio, Bruce, and Linda in second panel) did not increase or decrease positive interactions from baseline to BST + OJF; however, for all five staff, positive interactions were already occurring at or high levels (range: 83 - 100%). Finally, six staff (Adelaide in first panel; Jane, Mark, Brad, Poppy, and Breanne in second panel) decreased positive interactions from baseline to BST + OJF. The mean decrease was 14% (range: 5 - 29%). Therefore, for these six staff, decreases were minimal and positive interactions were already occurring at high levels in baseline.

Figure 16 depicts two panels for pre-post mean percentages of correct instructions for 30 staff from 16 homes and programs. Overall, 23 staff increased correct instructions from baseline to BST + OJF. The mean increase of correct instructions for these 23 staff was 40% (range: 10 - 100%). Furthermore, five staff (Courtney in first panel; Debra, Cameron, Lani, and Sid in second panel) did not increase or decrease the mean percentage of correct instructions from

baseline to BST + OJF (range: 50 - 100%). It is important to note that for four of these staff (Courtney in first panel; Debra, Cameron, and Lani in second panel), correct instructions were already occurring at 100% in baseline; however for one staff (Sid in second panel), both baseline and BST + OJF levels were at 50%. Thus, the intervention was not effective for increasing correct instructions for Sid. Finally, two staff (Rogelio and Christa in second panel) decreased the percentage of correct instructions from baseline to BST + OJF. The mean decrease was 16% (range: 9 - 23%). Therefore, for these two staff, decreases were minimal and correct instructions were already occurring at high levels in baseline.

Figure 17 depicts two panels for pre-post mean percentage intervals of correct responses to problem behavior for 26 staff from 15 homes and programs. Overall, 20 staff increased correct responses to problem behavior from baseline to BST + OJF. The mean percent increase for these 20 staff was 61% (range: 10 - 100%). Furthermore, five staff (Jesse in first panel; Brianne, Cameron, Hailey, and Jaxon in second panel) did not increase or decrease the mean percentage intervals of correct responses to problem behavior from baseline to BST + OJF (range: 67 - 100%). However, for four of these staff (Breanne, Cameron, Hailey, and Jaxon in second panel), correct responses to problem behavior were already occurring at high levels in baseline. For one of these staff (Jesse in first panel), correct responses occurred at moderate levels (i.e., 67%) in both baseline and BST + OJF. Finally, one staff (Amy in second panel) decreased the percentage of intervals of correct responses to problem behavior from baseline to BST + OJF. However, this decrease was minimal and correct responses to problem behavior were already occurring at high levels in baseline (i.e., 100% in baseline to 93% in BST + OJF).

BL, BST, and BST + OJF comparisons. Figures 18 - 20 depict mean performances for 25 applicable individual staff in baseline, BST, and BST + OJF for positive interactions. Figure

18 depicts data for 10 staff whose mean percent interval of overall positive interactions increased from BST to BST + OJF. For these 10 staff, on-the-job feedback (BST + OJF) may have been necessary for increased levels of positive interactions compared to initial training alone (BST). For seven staff (Lila, Laticia, Cameron, Angelica, Pierre, Hailey, and Georgia), the mean percent intervals of positive interactions systematically increased from baseline to BST to BST + OJF. This may suggest that continued exposure to the intervention, on-the job feedback, or a combination of both, resulted in the highest levels of positive interactions for these seven staff. For three staff (Nadaal, Brad and Mark), the mean percent intervals of overall positive interactions decreased in BST from baseline. However, baseline levels for two of these staff (Brad and Mark) were already high and both staff increased positive interactions in BST + OJF. For one staff (Nadaal), baseline and BST + OJF levels were at moderate levels, suggesting that the intervention may not have been effective for increasing positive interactions. Figure 19 depicts data for seven staff whose mean percent intervals of overall positive interactions in BST and BST + OJF is the same. For three of these staff (Courtney, Leon, and Fatima), overall positive interactions in BST and BST + OJF are higher than in baseline, suggesting that initial training alone (BST) may have been necessary to increase positive interactions. For four staff (Bruce, Rogelio, Linda, and Libby), the mean percentage intervals of positive interactions are at 100% across baseline, BST, and BST + OJF, suggesting that they did not need the intervention given that positive interactions were already occurring at their highest levels in baseline. Figure 20 depicts data for eight staff whose mean percent intervals of overall positive interactions are higher in BST compared to BST + OJF. However, for six of these staff (Roberta, Nicholas, Drake, Penny, Jane, and Alexandra), decreases from BST to BST + OJF are minimal and positive interactions continued to occur at high levels in BST + OJF. For two of these staff,

(Dwayne and Kaley), decreases were larger suggesting that initial training (BST) was the variable influencing behavior the most.

Figures 21 - 23 depict mean performances for 20 applicable individual staff in baseline, BST, and BST + OJF for effective instructions. Figures 21 - 22 depict data for 16 staff whose mean percentage correct instructions increased or remained the same from BST to BST + OJF. That is, for three staff (Saddie, Brianne, and Lani in Figure 21), the mean percentage of correct instructions increased from BST to BST + OJF, suggesting that on-the-job feedback may have been necessary to achieve their highest levels of correct instructions. For nine staff (Magdalena, Lisa, Aunica, Cassandra, and Angelica in Figure 21; Drake, Linda, Brad, Bella, and Jesse in Figure 22), BST and BST + OJF both resulted in 100% mean correct instructions, suggesting that initial training alone (BST) was necessary to achieve behavior change; furthermore, for these nine staff, baseline resulted in the lowest mean percentage of correct instructions. This outcome also underscores that initial training alone (BST) may have been the variable responsible for achieving the highest levels of staff correct instructions given that effective instructions increased to 100% and remained at this level through BST + OJF. For two staff (Sadie and Lani in Figure 21), the mean percentage of correct instructions decreased from baseline to BST; however, decreases were minimal and effective instructions increased to 100% mean correct instructions in BST + OJF. For one staff (Brianne in Figure 21), the mean percentage of correct instructions systematically increased from baseline to BST to BST + OJF. This may suggest that continued exposure to the intervention, on-the job feedback, or a combination of both, resulted in the highest levels of correct instructions for this staff. For three staff (Christa, Courtney, and Debra in Figure 22), the mean correct instructions were at 100%, suggesting that these staff may not have needed the intervention given that effective instructions were already high in baseline.

For two of these staff (Courtney and Debra; Figure 22) levels of correct instructions remained at 100%; however, for one of these staff (Christa), levels decreased to moderate levels in BST and in BST + OJF. Figure 23 depicts data for four staff whose mean percentage correct instructions are higher in BST compared to BST + OJF. For one of these staff (Pierre), correct instructions are at 100% in baseline, suggesting that the intervention may not have been necessary for behavior change.

Figures 24 - 25 depict mean performances for 12 applicable individual staff in baseline, BST, and BST + OJF for correct responses to problem behavior. Figures 24 depicts data for seven staff whose mean percentage intervals of correct responses to problem behavior increased or remained the same from BST to BST + OJF. That is, for two staff (Nash and Christa), the mean percentage intervals of correct responses to problem behavior systematically increased from baseline to BST to BST + OJF. This may suggest that continued exposure to the intervention, on-the job feedback, or a combination of both, resulted in the highest levels of correcting responding to problem behavior for these staff. For four staff (Rogelio, Brad, Mason, and Cassandra), the mean percentage intervals of correct responses to problem behavior increased from baseline to BST and remained at 100% from BST to BST + OJF, suggesting that for these staff, initial training alone (BST) may have influenced the increase in behavior. For one staff (Jaxon), the mean percentage intervals of correct responses to problem behavior was already at 100% in baseline and maintained through BST and BST + OJF, suggesting the intervention was not necessary for this staff. Figure 25 depicts data for five staff whose mean percentage intervals of correct responses to problem behavior decreased from BST to BST + OJF. For three of these staff (Libby, Jesse, and Kaley), training alone (BST) resulted in the highest levels of correct responses to problem behavior compared to both baseline and BST +

OJF, suggesting that training alone (BST) was the variable responsible for behavior change. For two of these staff (Allison and Breanne), the mean percentage intervals of correct responses to problem behavior were already high in baseline, suggesting that these two staff may not have needed the intervention for behavior change.

Discussion

The purpose of our study was to derive and train staff on four healthy behavioral practices that are based on common functions of problem behavior and function-based interventions in behavior analytic research (Beavers et al., 2013; Hagopian et al., 2013) as well as research on active treatment in services for adults with IDD (e.g., Parsons et al., 2004; Realon et al., 2002). It was our goal to derive a simple set of skills that may be associated with preventing the future occurrence of problem behavior in service environments for adults with IDD (i.e., community-based homes and day programs).

Overall, results of the main dependent variables suggest that BST and OJF were effective for behavior change across the different healthy behavioral practices and across homes and programs. Specifically, our outcomes with respect to mean percentage change summaries suggest: (a) staff in 17 of 19 programs increased percent intervals of positive interactions; (b) staff in 16 of 18 programs increased percentage of effective instructions; (c) staff in 15 of 17 programs increased mean correct responses to problem behavior, and staff in 16 of 17 programs increased percent intervals of high-quality interactions; and (d) staff in 12 of 18 programs increased mean percent intervals of prompts with choice, consumers in 17 of 18 programs increased mean percent intervals of engagement, and staff in 17 of 18 programs increase mean percent intervals of positive interactions for engagement.

Previous studies have evaluated the effects of effective organizational behavior management procedures for affecting change in staff behavior in programs for adults with IDD (Harchik & Campbell, 1998; Reid, Parsons, & Jensen, 2017; Van OOrsouw et al., 2009); however, there are some limitations of this research. That is, (a) few studies have been conducted in community-based programs, (b) most studies have been implemented on a small scale (e.g., few staff participants in few programs), (c) most studies have focused on training only one or two skills, and (d) most studies involved staff observations during only one or two specified activities, rather than across the day. Thus, our study extends research on training staff important active treatment skills in community-based programs for adults with IDD by training a large number of staff in a large number of homes and programs, in addition to training multiple skills and conducting observations across various times (i.e., morning, afternoon, and evening times) on all days of the week (Sunday – Saturday) during unstructured (e.g., leisure periods) and structured activities (e.g., music class).

In addition to the main dependent variables, we conducted additional analyses to determine individual performance for applicable staff for the first three practices (provide positive interactions; provide effective instructions; provide correct responses to problem behavior). First, we conducted a pre-post comparison of staff mean performance in baseline and BST + OJF phases. Overall, results of this analysis suggested increases in positive interactions for 25 of 36 staff, increases in effective instructions for 23 of 30 staff, and increases in correct responses to problem behavior for 20 of 26 staff. Second, we compared the mean performance in baseline, in the first observation following initial training (BST), and in subsequent observations following on-the-job feedback (BST + OJF) for applicable staff. Overall, for staff who had low or moderate levels in baseline (below 80% and thus needed intervention for

behavior change), results of this analysis suggested: (a) for positive interactions, BST was more effective than BST + OJF for six of 17 staff, BST + OJF was more effective than BST (initial training alone) for eight of 17 staff, and BST and BST + OJF were similarly effective for three of 17 staff; (b) for effective instructions, BST was more effective than BST + OJF for one of 10 staff, BST + OJF was more effective than BST (initial training alone) for one of 10 staff, and BST and BST + OJF were similarly effective for eight of 10 staff; (c) for responding to problem behavior, BST was more effective than BST + OJF for three of nine staff, BST + OJF was more effective than BST for two of nine staff, and BST and BST + OJF were similarly effective for four of nine staff. Overall, these results suggest there were no consistent outcomes with respect to individual staff behavior in observations following initial training alone (BST) and initial training plus on-the-job feedback (BST + OJF).

Our pre-post outcomes for applicable individual staff replicated previous findings reported by active treatment studies in programs for adults with IDD that showed improved staff performance following training (e.g., Fleming & Sulzer-Azaroff, 1992; Zoder-Martell et al., 2014). Furthermore, some of our outcomes on staff performance in BST and BST + OJF replicated previous outcomes that showed slightly lower levels of staff performance in observations conducted several days after initial training (e.g., two weeks; Parsons et al., 2004). Additionally, some of our outcomes in this analysis highlighted the importance of ongoing on-the-job support and feedback for continued improvements in individual staff behavior, which has been suggested by several researchers as a supervision approach that should be used by companies in service provision (e.g., DiGennaro Reed et al., 2013; Harchik & Campbell, 1998).

There were several interesting outcomes of our study. First, our baseline data suggested that staff in most homes and programs were not implementing interactions and procedures that

have been shown to be effective aspects of best practice in service provision for adults with IDD (i.e., active support and treatment; Parsons et al., 2004; Reid et al., 2001) and that are based on effective function-based interventions for common functions of problem behavior (Hagopian et al., 2013). For example, positive interactions in baseline were relatively low in some homes and programs (e.g., Figure 1), consumer engagement was low in many programs (e.g., Figure 11), and staff were providing multiple forms of attention (e.g., reprimands and preferred interactions) following the occurrence both minor and severe problem behavior across various homes and programs. These data are in line with both older and more contemporary research that evaluated the occurrence of important behaviors such as staff positive interactions, consumer engagement, and staff provision of choices to consumers (e.g., Chan & Yau, 2002; Parsons et al., 2004; Repp et al., 1981). Thus, our baseline data underscore the continued need for research focusing on affecting important staff behavior change in services for adults with IDD, particularly given the association between these types of staff behaviors and the occurrence of problem behavior in adults with IDD. Second, the SMA analyses sometimes did not show significant effects for data sets for which our visual analyses suggested effects (e.g., E-1 and O-1 in Figure 7). Although we conducted this analysis as an additional measure of the effects of our intervention, it is important to note that the SMA calculation software may produce unreliable outcomes when given extreme outliers (e.g., O-1 in Figure 7; Borckardt et al., 2013). Therefore, we caution the reader to interpret our SMA analyses with this consideration. Third, our analyses of individual staff performance in BST compared to BST + OJF did not yield a strong suggestion for better overall staff performance across one of two conditions. This may be because we conducted our training on-the-job, which may have been similar to OJF. That is, when we trained staff on-the-job, consultants may have implemented modeling and rehearsal aspects of BST with consumers

present in the common areas. Thus, when consultants provided staff with feedback during training, it may have resembled feedback during OJF. Furthermore, this outcome may suggest that staff performance may have been influenced by observer reactivity (discussed in detail below).

Our results extend previous research in determining potential prevention practices (e.g., Hanley et al., 2007; St. Peter & Marsteller, 2017) and the efficacy of staff training procedures to promote those practices (e.g., Parsons et al., 2004); however, there are some methodological and analytical limitations that should be addressed in future research. First, staff were different across baseline and BST + OJF phases and across the different healthy behavioral practices. That is, staff who participated in our baseline phase may not necessarily have been the same staff in our intervention phase (BST + OJF). There were several variables that contributed to this limitation. First, it was due to staff turnover, call-offs, and staff working across various programs within the company. Second, we conducted training and observations with whichever staff was present at the of the training or observation. That is, we had no control over which staff would be present in the homes or programs during our study. Thus, in some homes and programs, and for some practices, the staff were the same across baseline and BST + OJF; however, this was not always the case. Furthermore, some staff may have been observed several times across baseline, BST + OJF, or both, both within and across healthy behavioral practices in a home or program. Although the presence of different staff across phases is a limitation of the study, it was a variable we could not control given (a) the time frame in which we conducted the study, (b) the fluctuating staff schedules and turnover rates, and (c) the major purpose of the evaluation, which was to train important skills to staff in a short amount time to affect positive staff behavior change. That is, it was more important to train and provide feedback to any staff

who worked in the homes or programs than it was to train and observe the same staff across phases. However, we conducted pre-post analyses of staff who participated in both baseline and BST + OJF phases in an attempt to circumvent this limitation within the constrictions of the conditions of our study. Future research might be conducted in environments in which staff turnover is low (i.e., the same staff are more likely to be in a particular home or program) or be conducted with individual staff as the unit of measurement as compared to our approach, which used the homes and programs as the major unit of measurement.

Second, due to various constraints by the company (e.g., staff needed on the floor), our initial training of each healthy behavioral practice with staff had to occur with one or two staff at a time in the various homes and programs. This individualized training may have had some benefits; however, it resulted in a large time commitment for the doctoral student consultants who conducted these trainings. Thus, future research might look at the efficacy of conducting the initial training in small or large group formats to increase the efficiency of the training. Furthermore, we did not collect data on the precise amount of time allocated to training and on-the-job observations and feedback as a measure of the efficiency our intervention. Thus, future research should conduct a cost analysis to determine how much time and resources are needed to implement this type of training, particularly on this large of a scale. Furthermore, it would be important to determine ways in which our intervention could be made more economical, particularly when there are very few behavior analysts in a company that may be able to allocate their time to this type of intervention. One avenue for future research would be to train home coaches or other program supervisors to conduct the training, observations, and feedback with staff (i.e., a pyramidal training model; Harchik & Campbell, 1998; Page, Iwata, & Reid, 1982; Parsons, Rollyson, & Reid, 2013; Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995). One

benefit of the pyramidal training model is that the supervisors may already spend time in the homes and programs to fulfil various supervisory responsibilities and likely have rapport with staff; therefore, training, observations, and feedback may be conducted in the context of ongoing supervisor visits of the homes and programs. Another benefit of this model is that it may be more conducive for various supervisors to train staff, who may be spread across different community-based programs in the area, than it would be for the few behavior analysts hired by the company.

Third, other variables that we manipulated (in addition to the healthy behavioral practices) combined with other staff training history (e.g., Mandt System®) may have influenced the outcomes of our study. For staff correct responses to problem behavior, we made changes to some consumers' behavior plans to be in line with our training (i.e., no longer providing attention following problem behavior). This change was initiated during baseline in some programs and may have contributed to behavior change in conjunction with our intervention. Additionally, at the time of our training, the company trained newly hired staff to use the Mandt System® for crisis prevention and management, which emphasized using verbal de-escalation procedures for problem behavior that may have been categorized as severe problem behavior in our study and should have resulted in EXT (e.g., low intensity SIB such as leg slapping). That is, the Mandt System® trained staff to implement planned ignoring only when in crisis (i.e., situation became severe and dangerous), and not necessarily based on the topography and potential severity of the problem behavior; thus, staff could talk to consumers who were engaging in severe problem behavior (e.g., SIB), which may have resulted in reinforcement of the problem behavior (i.e., high-quality interactions). On the other hand, similar to our training, the Mandt System® also trained staff to redirect minor disruptive behavior and to minimize

attention to problem behavior during crisis situations. Thus, staff prior history with the Mandt System® may have influenced the occurrence and nonoccurrence of staff behavior observed in our study. For promoting consumer engagement, following baseline, we made changes in the environment by working with the company to purchase items and activities that were reported to be preferred for consumers in the homes, such that there were more items and activities with which the consumers could engage. Thus, this variable, in conjunction with BST + OJF, may have influenced consumer engagement levels. In fact, this was likely the case because we observed very large increases in consumer engagement in the EE + BST + OJF phase despite the lack of robust changes in staff providing prompts with choice for engagement. Thus, these data suggest that EE may have been the variable influencing consumer engagement. Future research should include making such changes prior to baseline or in a separate phase after baseline to determine the influence of these variables (i.e., EE and BST + OJF) in isolation.

Fourth, there were some discrepancies between what we trained and how we collected data on particular aspects of several practices (i.e., providing effective instructions; promoting consumer engagement). First, for providing effective instructions, we trained staff to provide prompts (e.g., model or gestural) if the initial vocal-verbal instruction did not result in the consumer engaging in the directed behavior. However, during observations, data collectors scored an instruction as correct if at any point during the instructional chain, staff provided a prompt (i.e., provided a prompt with the initial vocal-verbal instruction or with any other vocal-verbal instruction that followed prior to compliance and prior to moving on to new instruction). Although this was not ideal, we chose to collect data in this way because some consumer rehabilitation plans included instructions for staff to provide consumers with a vocal-verbal prompt several times. Given this, rather than working on changing habilitation plans, we chose

to collect data in a less conservative way compared to what we trained. It is important to note, however, that when consultants provided feedback to staff following observations, they included feedback regarding providing consumers with prompts early on in the instruction chain (i.e., after noncompliance to the original vocal-verbal instruction). In general, we wanted to determine whether we observed increases in staff prompts and help to consumers during instructional sequences. Our global analyses of pre-post training changes in the different instruction elements across all homes and programs suggest that tell/show instructions were occurring with approximately 60% of instructions in baseline and increased to near 100% levels in BST + OJF. Therefore, our data suggest that staff increased the use of prompts and or help to consumers during demand contexts. Although these increased levels may have been influenced by consumer compliance following the vocal-verbal instruction (and therefore eliminating the need for staff to use prompt or help), this was unlikely the case considering that the other two instruction elements that might have influenced compliance (and encompassed the *tell* element of the instruction; simple and clear instructions; "do" requests) were already occurring at high levels (near 100%) during baseline. Thus, these results suggest that increases in the tell/show element may have been staff providing prompts and help to consumers during demand contexts. Second, for promoting consumer engagement, we collected data on staff provision of high-quality interactions for consumer engagement even though we did not specifically train staff do to this within the context of our specific training. We collected data on this, however, because staff were previously trained on providing positive interactions for appropriate consumer behavior and because we anticipated providing OJF for relevant staff interactions during this context (e.g., descriptive praise for engagement).

Fifth, for all healthy behavioral practices, we collected data on the behavior of individual staff or a group of staff (typically two) to determine whether staff working in the homes and programs could acquire and potentially maintain those skills (i.e., for staff for which we have multiple observations during the intervention phase). However, a limitation of our study is that we did not collect data on consumer behavior (with the exception of consumer engagement data in the practice on promoting consumer engagement). Researchers have suggested the importance of collecting data not only on staff behavior to determine whether they acquired important skills but also to measure consumer behavior as an ancillary measure on the utility of staff behavior change (Harchik & Campbell, 1998). That is, given that a major reason for our intervention was for it to function as a preventive procedure for decreasing problem behavior and increasing appropriate behavior in adult consumers with IDD, it would have been important to determine whether staff acquisition of skills were associated with decreases in consumer problem behavior and increases in appropriate behavior. There are various ways in which we could have measured consumer problem behavior (e.g., evaluation of the number of incident reports and staff data on problem behavior); however, there were several challenges that did not allow us to do so. First, in our review of staff incident reports and data collection procedures, we observed that these data were inaccurate and sometimes not collected at all. Second, with respect to incident reports, given the truncated nature of our evaluation and the fact that we conducted trainings on the practices in a systematic fashion (not all at one time), our analyses of incident reports would have needed to be for a period of time prior to the beginning of the study and for a period of time following training of all practices. However, toward the end of training on the last practice (i.e., promoting consumer engagement), the company administration asked us to begin writing and training individualized behavior plans for various

consumers in these homes (i.e., what we were initially contracted to do with the company). Thus, the implementation of these individualized plans would have likely been a confound regarding the occurrence of consumer problem behavior. Regardless, we could have collected data on consumer problem behavior and appropriate behavior during our observations; however, given the truncated observation periods (15 min), it may have been unlikely to see changes in consumer problem behavior in such short observation durations and few overall observations after implementation of the intervention, particularly when different staff are being observed over time. Given these challenges, we decided to focus on various analyses of staff acquisition of healthy behavioral practices. However, future research should be conducted to determine the association between the implementation of the four staff healthy behavioral practices over an extended period of time and analyze data for problem behavior and appropriate behavior to assess whether changes in staff behavior are associated with concomitant positive outcomes for consumers. As suggested by previous research, behaviors other than problem behavior could be measured that suggest positive effects of healthy behavioral practices implemented by staff including indices of happiness (e.g., consumer affect; Green & Reid, 1996), consumer interactions with staff, and consumer compliance with various tasks and activities.

Sixth, we used an AB designs to collect repeated measures of behavior across baseline and BST + OJF phases and across all four healthy behavioral practices in a large number of homes and programs. However, we also conducted statistical analyses (i.e., SMA) of our data as an additional measure for evaluating our intervention. It is also important to note that within the context of the evaluation, several naturalistic nonconcurrent multiple baselines across homes/programs and practices occurred; thus, they provided additional experimental control and confidence in the effects of our intervention. As mentioned in our method section, there were

several reasons why we did not program for multiple baselines in our study. That is, we were unable to stagger training across homes/programs for each healthy behavioral practice because staff worked across homes and programs. Therefore, if we had trained a staff in one home or program but not another, we could not guarantee that those trained staff would not substitute for staff who called out in a home/program for which we had not yet implemented training. Second, given the clinical focus of our consultation, we did not want to have certain homes/programs in long baselines before accessing training. Future research might involve using multiple baselines to evaluate the efficacy of training on healthy behavioral practices by using multiple baselines across homes/programs or practices in environments in which it is less likely that staff would be working across homes and programs and possibly at a smaller scale (e.g., across practices in one home or across a smaller number of homes for each healthy behavioral practice).

Seventh, for some healthy behavioral practices in some homes or programs, we had few overall observations or observations during BST + OJF. This was influenced by fluctuating schedules in homes and programs (e.g., consumers and staff being out of the home for various reasons and sometimes unexpectedly). Furthermore, with respect to promoting consumer engagement, we have few observations during the intervention phase for quite a few homes for several reasons. First, we wanted to make sure that new items and activities were purchased by the company for the common areas in all homes, which was delayed for various logistical reasons outside of our control. Second, this was the last practice we trained, and pretty soon after we began training (a) the administration asked us to incorporate our healthy behavioral practices training procedures into their new-hire training as soon as possible and (b) we no longer wanted to delay initiating the next phase of our consultation, which included conducting

FBAs, writing, and implementing individualized behavior plans for some consumers in the homes and programs.

The eighth limitation of our study is that we did not collect maintenance data. That is, given that our study was conducted with various staff within and across phases and in various homes and programs during a relatively short period of time, we were not able to determine whether the effects of our intervention could maintain over time in the absence of intervention. Furthermore, we did not collect data on the occurrence of healthy behavioral practices outside of our in-person observations during the intervention phase, which does not allow us to determine whether staff were implementing these practices throughout the day (i.e., outside of our 15-min in-person observations). Along these lines, another limitation of our study is observer reactivity might have influenced our outcomes. That is, it possible that staff implementation of healthy behavioral practices only occurred during the intervention phase when the consultants were present conducting observations, particularly given what we know about the influence of reactivity (Brackett, Reid, & Green, 2007; Kazdin, 1979). The possibility of observer reactivity influencing staff behavior is further underscored by our outcomes for individual staff, whose data showed no robust differences in BST and BST + OJF. It could be that the presence of the observer, and not just the intervention, influenced staff performance following initial training (BST) and training plus on-the-job feedback (BST + OJF). Therefore, future research should assess maintenance of the effects in the absence of the intervention over time. Furthermore, future research might use technology (audio-video technology; DiGennaro Reed & Reed, 2013) to conduct unobtrusive observations in which staff are unaware of being observed to determine whether they continue to engage in healthy behavioral practices in the absence of in-person observations.

Finally, we did not collect implementer integrity, nor did we collect social validity data on the acceptability of our intervention and training practices. Although the consultants followed a specific on-the-job feedback protocol to increase the likelihood that they provided feedback to staff in a consistent and systematic manner, we did not collect integrity data regarding the consultant's implementation of on-the-job feedback. Thus, future research should consider collecting independent data on the degree to which consultants implement feedback based on the prescribed feedback protocol. Implementer integrity may even be more warranted if the pyramidal training model is used given that individuals who are not experts in in the field would be conducting the training and providing staff with feedback. Furthermore, although various administrators and staff commented on positive aspects of healthy behavioral practices, staff training, and on-the-job staff feedback and support, we did not conduct formal social validity evaluations of the practices and training. However, some aspects that support the acceptance of the practices and training are that (a) the administration chose to begin training healthy behavioral practices to all newly hired staff as part of initial staff training, (b) the administration asked us to create a modified, one-page, supervisor-friendly version of the observation sheet such that home and program supervisors could observe and provide feedback on all four practices in a single observation, and (c) the company adopted a crisis prevention and management system that is more in line with our training and is based on behavior analytic approaches to preventing and managing problem behavior in persons with IDD (i.e., Safety Care™). Regardless, future research should involve systematic social validity assessments of the practices and training to determine any changes that might be necessary to enhance the adoption and acceptability of the practices in various environments.

In summary, our study provides preliminary information regarding a proposed prevention package of important staff skills that are based on the active treatment literature for adults with IDD (e.g., Chan & Yau, 2002) and FBA and function-based intervention literature for the assessment and treatment of problem behavior in individuals with IDD (Fisher & Bouxsein, 2011; Hagopian et al., 2013). Furthermore, our study shows the effects of an effective training package for increasing staff implementation of these practices. Although there were some methodological limitations, the results suggest that a large number of staff could be trained numerous skills that have previously been associated with reduction in the occurrence of problem behavior maintained by common functional variables. In addition to addressing some of the methodological limitations discussed above, future research might involve determining whether training consumers to engage in certain behaviors (e.g., functional communication responses, waiting for access to functional reinforcers via delay and denial training) may enhance the efficacy of staff implementation of healthy behavioral practices and result in more robust decreases in the occurrence of problem behavior (Hanley, 2010).

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Figures

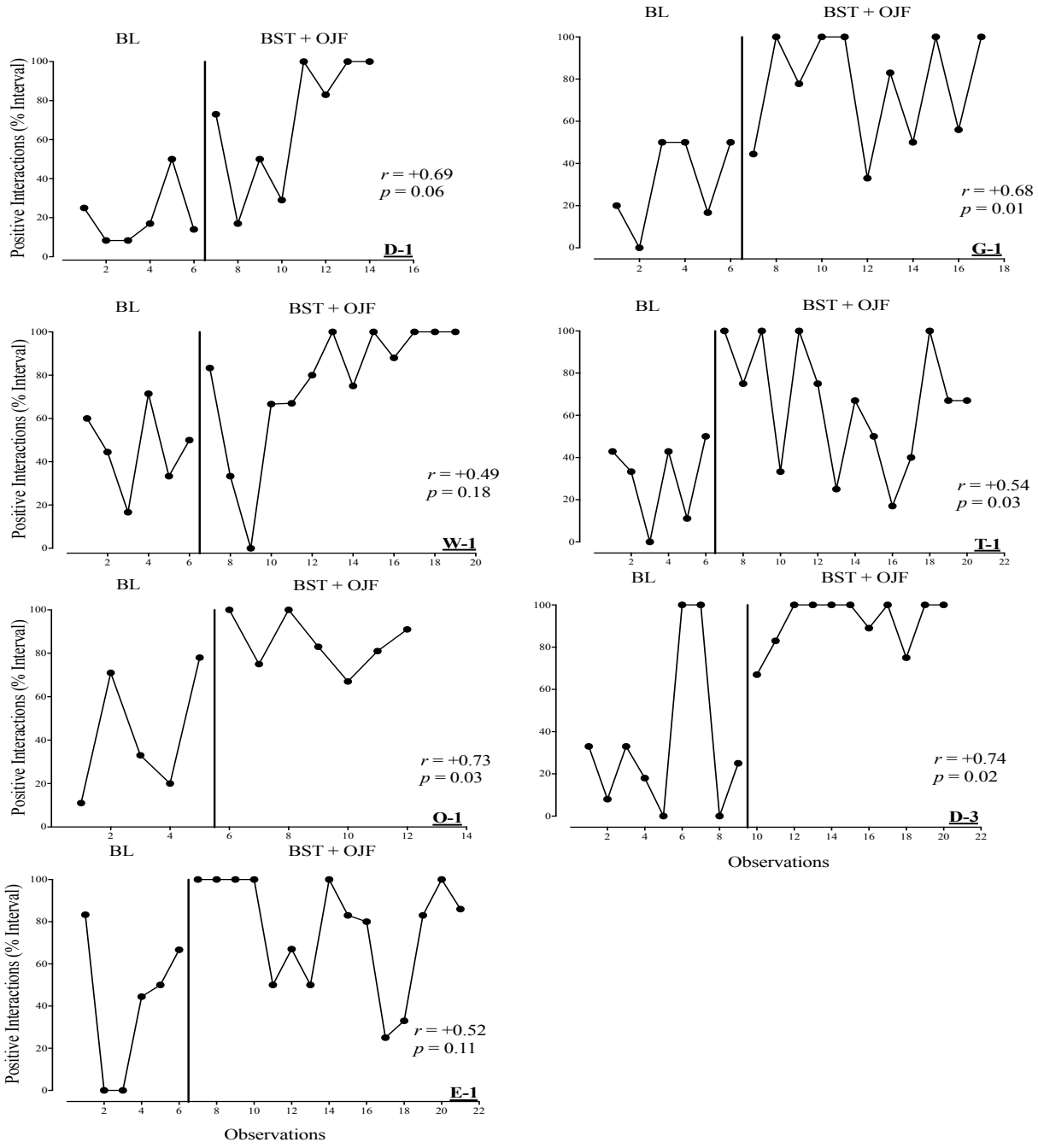


Figure 1. This figure depicts the percentage intervals of overall positive interactions for seven homes and programs that showed relatively low levels of positive interactions in baseline and increased levels of positive interactions in BST + OJF.

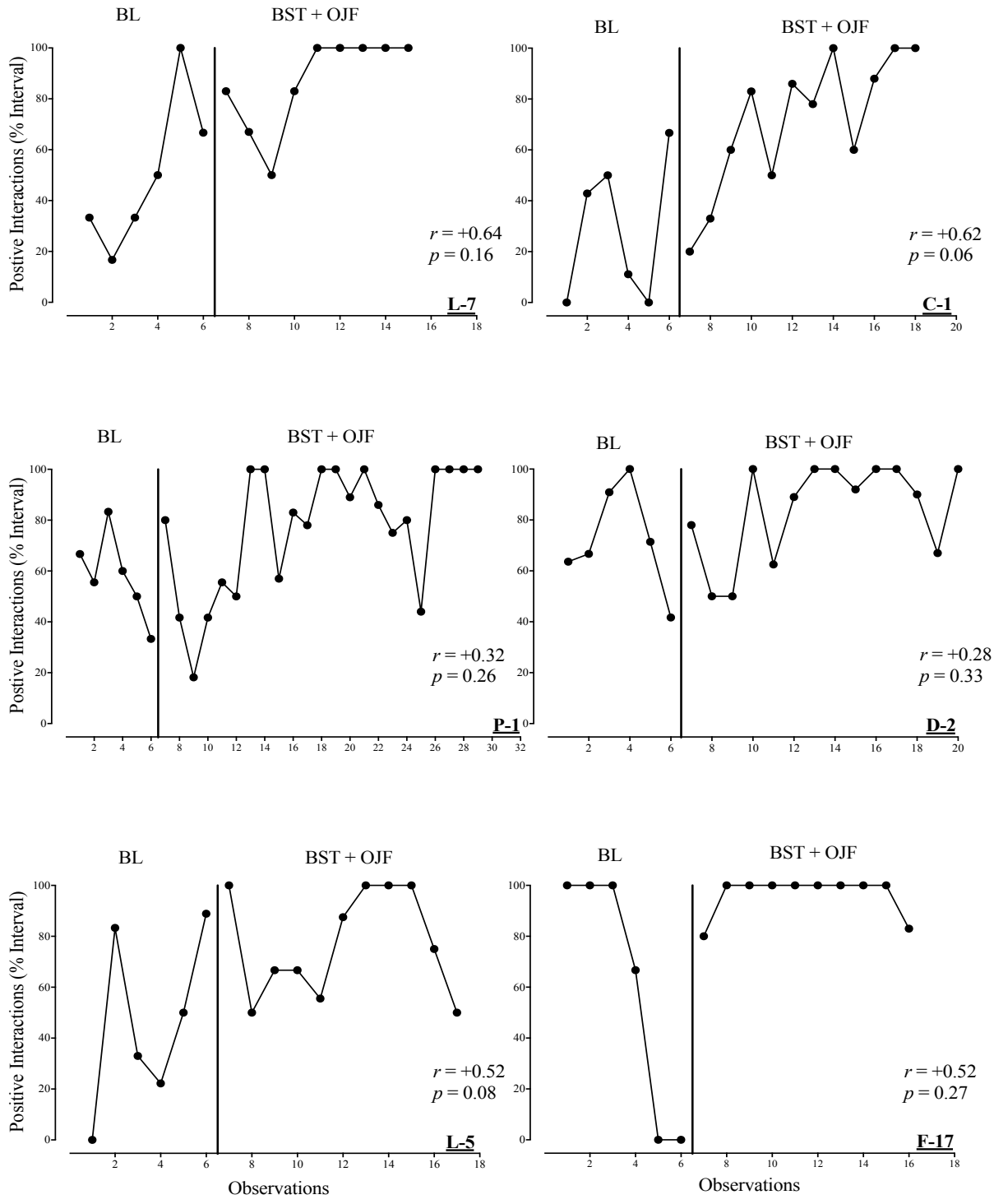


Figure 2. This figure depicts the percentage intervals of overall positive interactions for six homes and programs that had an increase in level, stability, or both from baseline to BST + OJF.

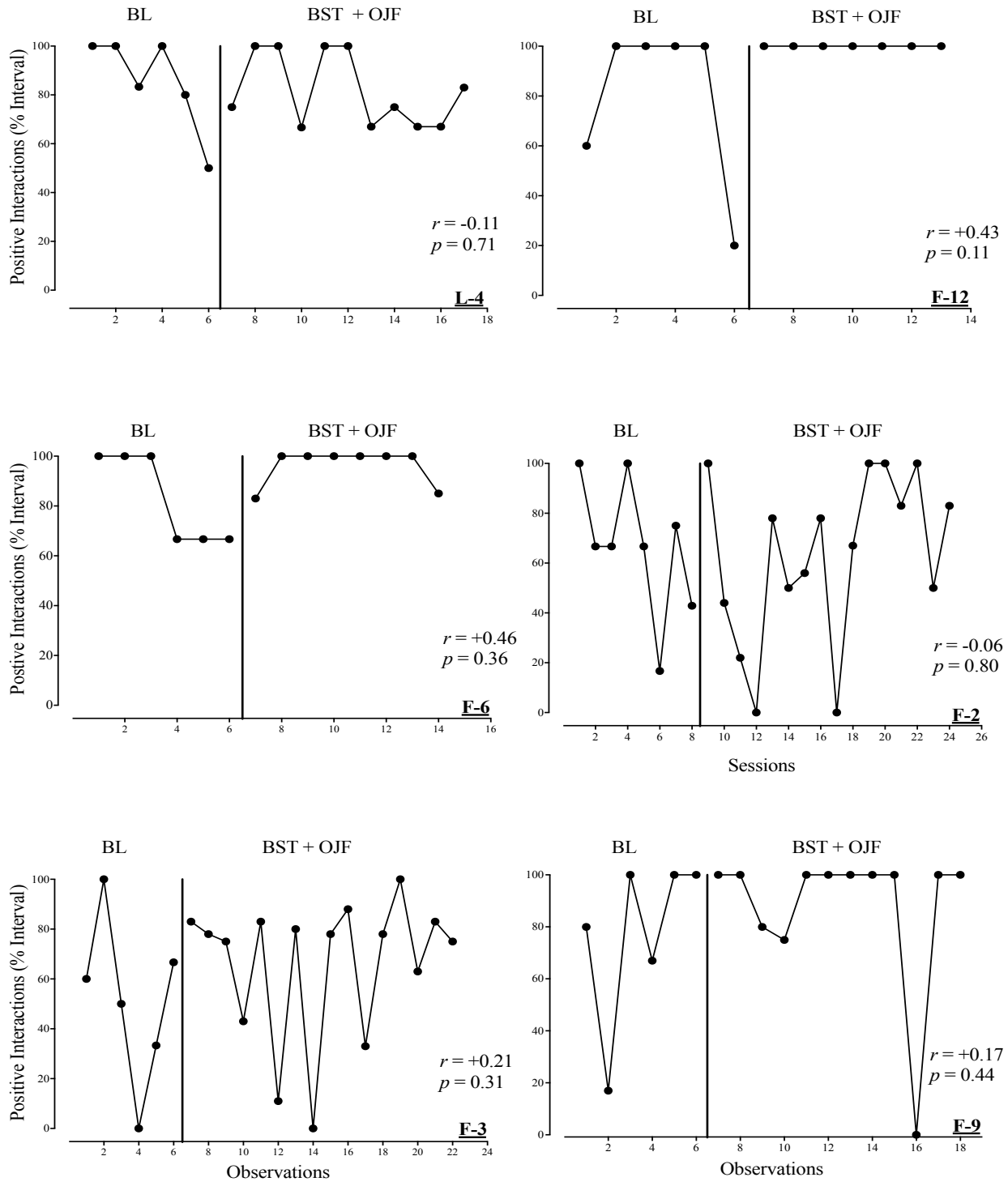


Figure 3. This figure depicts the percentage intervals of overall positive interactions for six homes that showed no clear differences from baseline to BST + OJF.

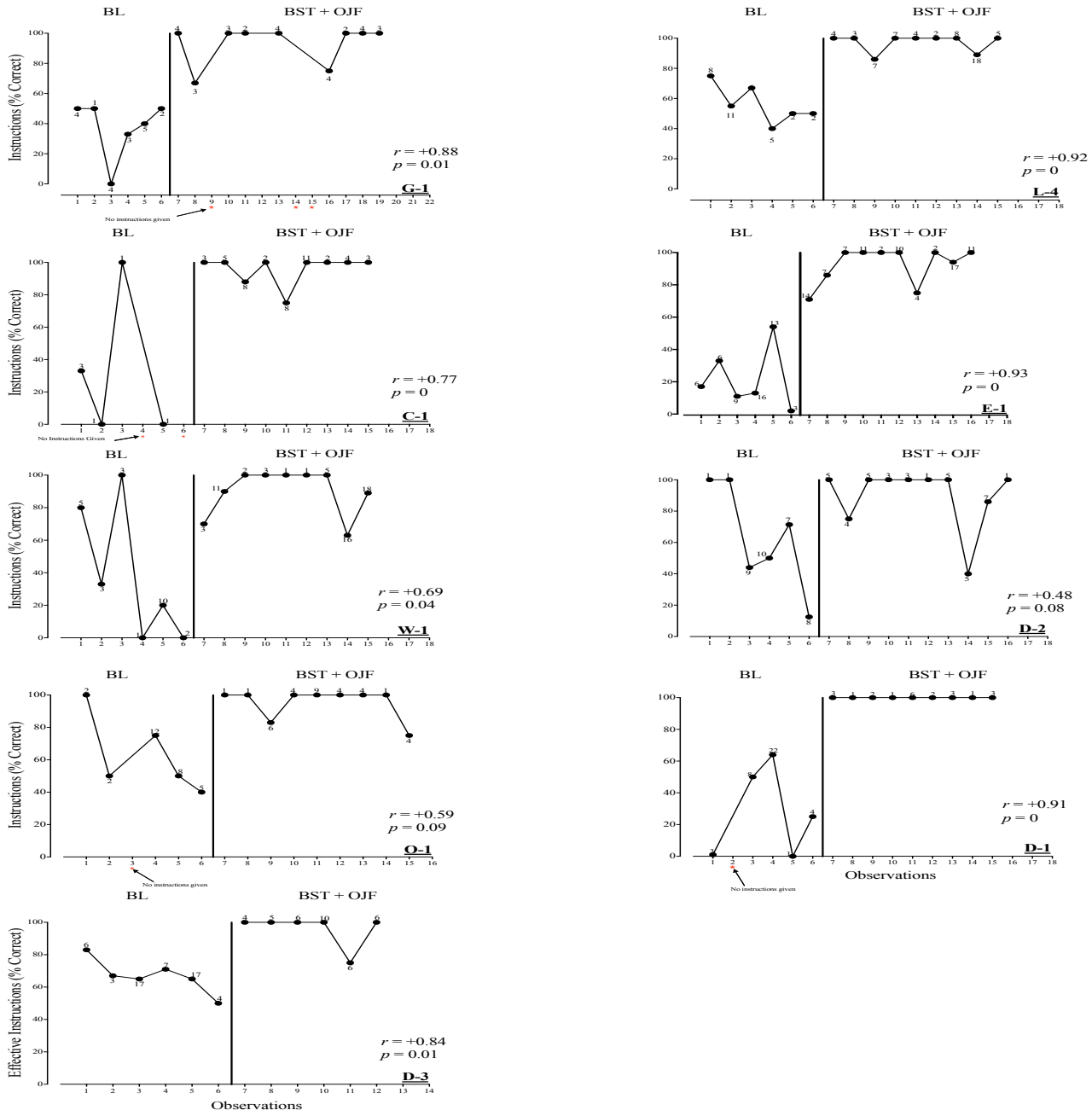


Figure 4. This figure depicts the percentages of correct instructions for nine homes and programs that showed low or consistently decreasing levels of correct instructions in baseline and higher, more stable levels of correct instructions in BST + OJF. The numbers on each data point depict the number of instructions in the observation. The asterisks at the bottom of some graphs depict sessions in which staff did not provide instructions.

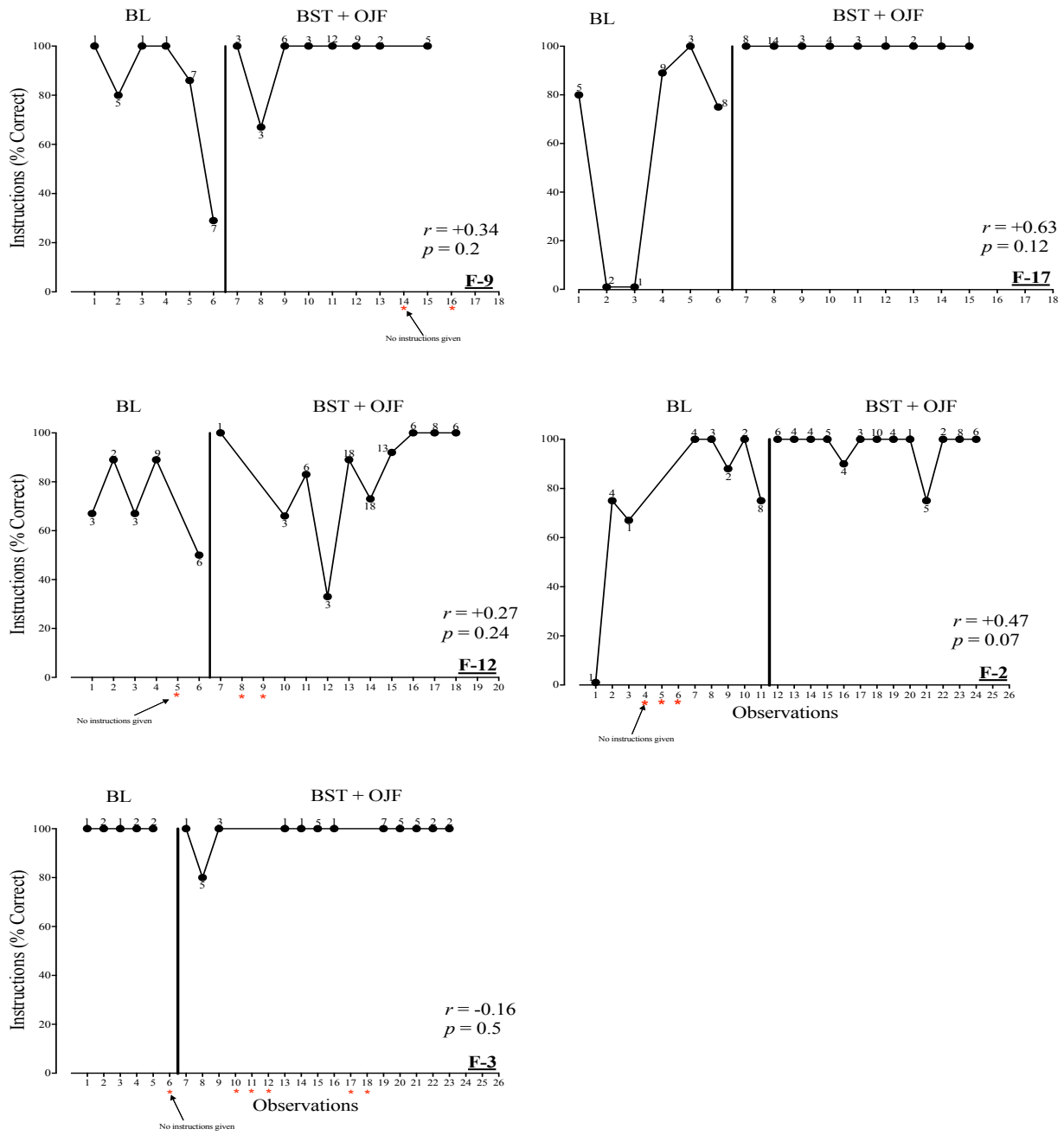


Figure 5. This figure depicts the percentages of correct instructions for five homes that showed high or increasing levels of correct instructions in baseline and maintained high levels in BST + OJF. The numbers on each data point depict the number of instructions in the observation. The asterisks at the bottom of some graphs depict sessions in which staff did not provide instructions.

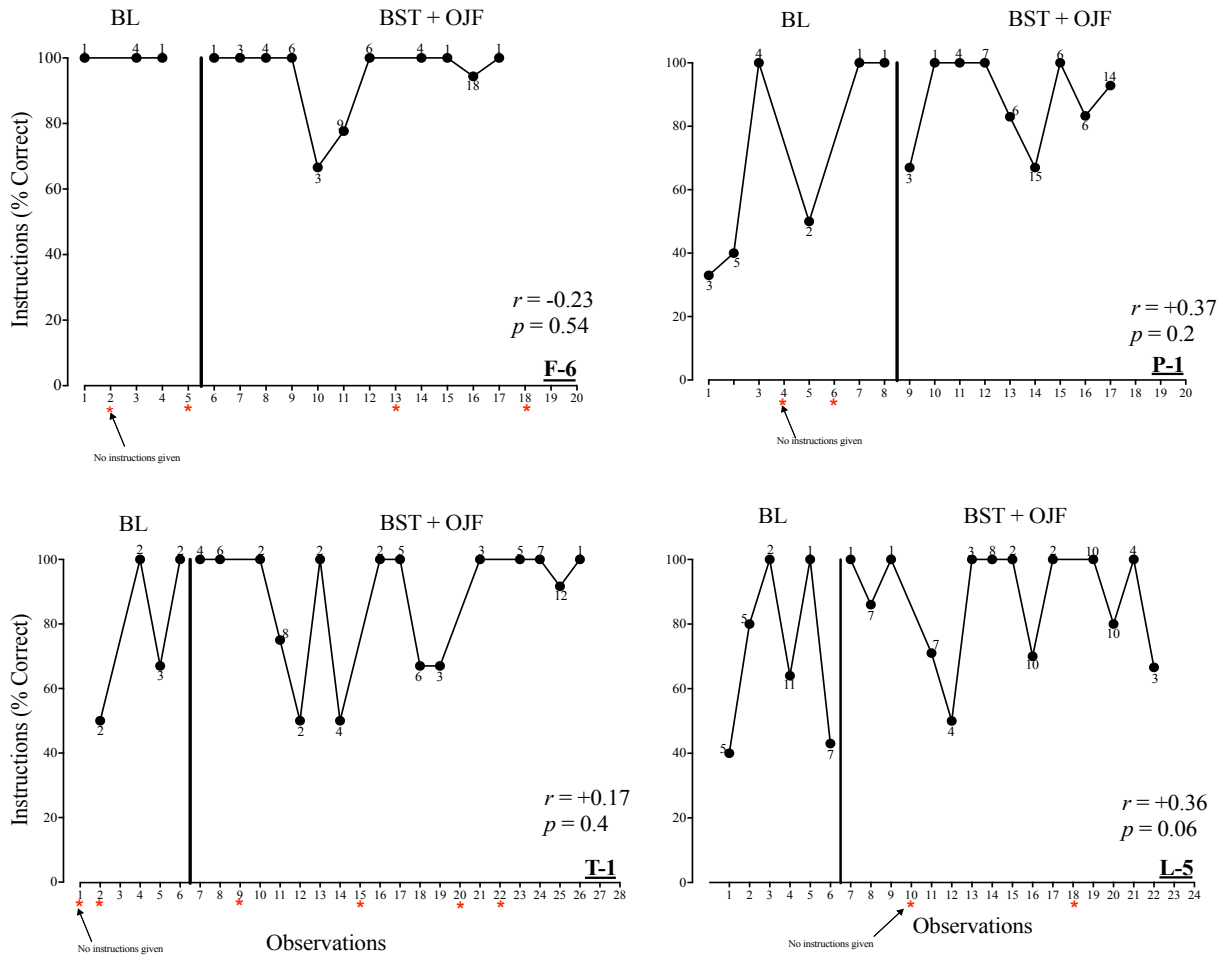


Figure 6. This figure depicts the percentages of correct instructions for four homes that showed high or increasing levels of correct instructions in baseline and maintained high levels in BST + OJF. The numbers on each data point depict the number of instructions in the observation. The asterisks at the bottom of some graphs depict sessions in which staff did not provide instructions.

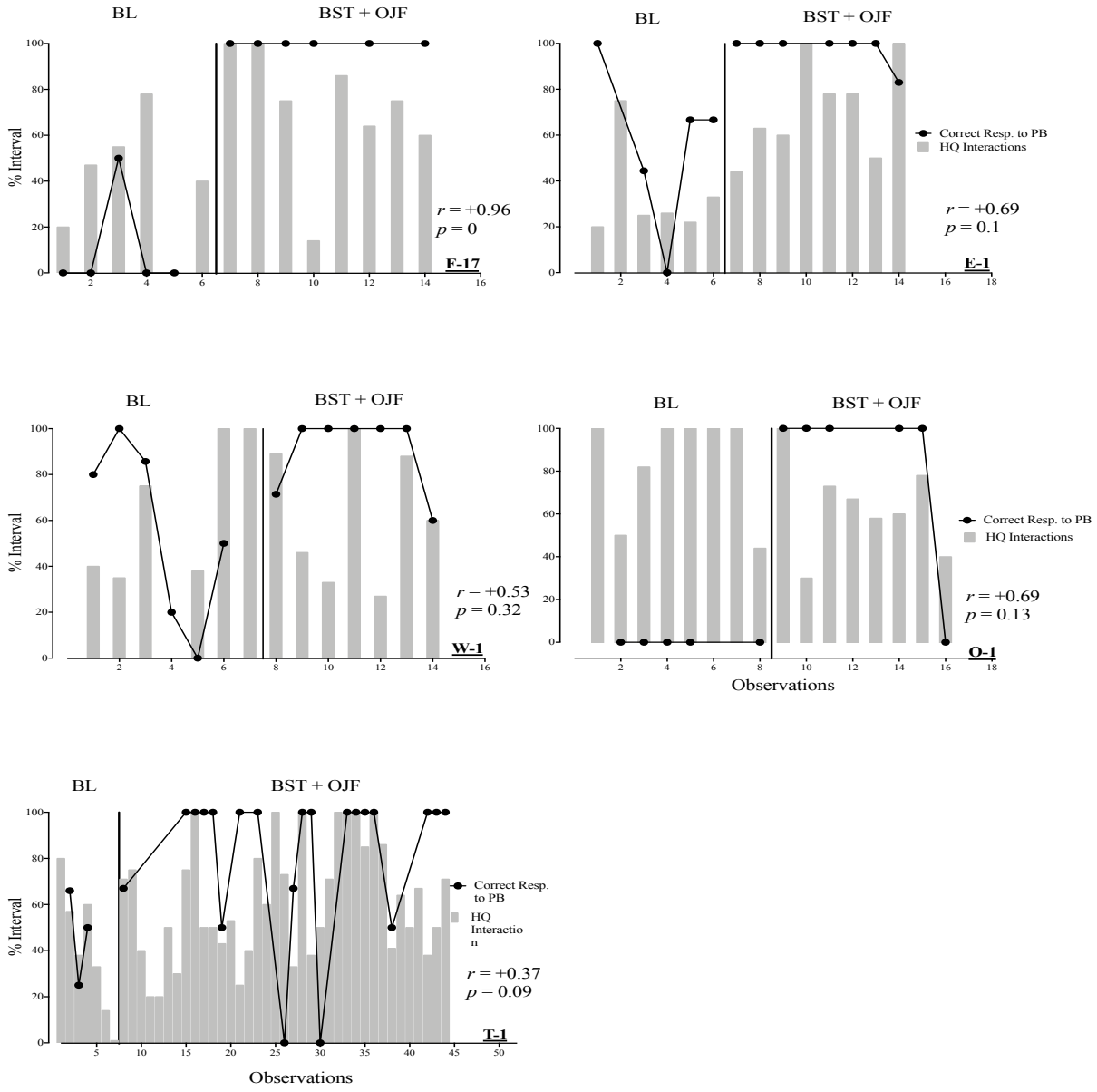


Figure 7. This figure depicts the percent intervals of correct responses to problem behavior (black circles) and staff high-quality interactions (gray bars). For these five homes, correct responses to problem behavior are low or decreasing in baseline and high and stable in BST + OJF. Sessions missing data points are those in which staff did not have the opportunity to respond correctly or incorrectly to problem behavior. The *r* and *p* values are for staff correct responses to problem behavior (black circles).

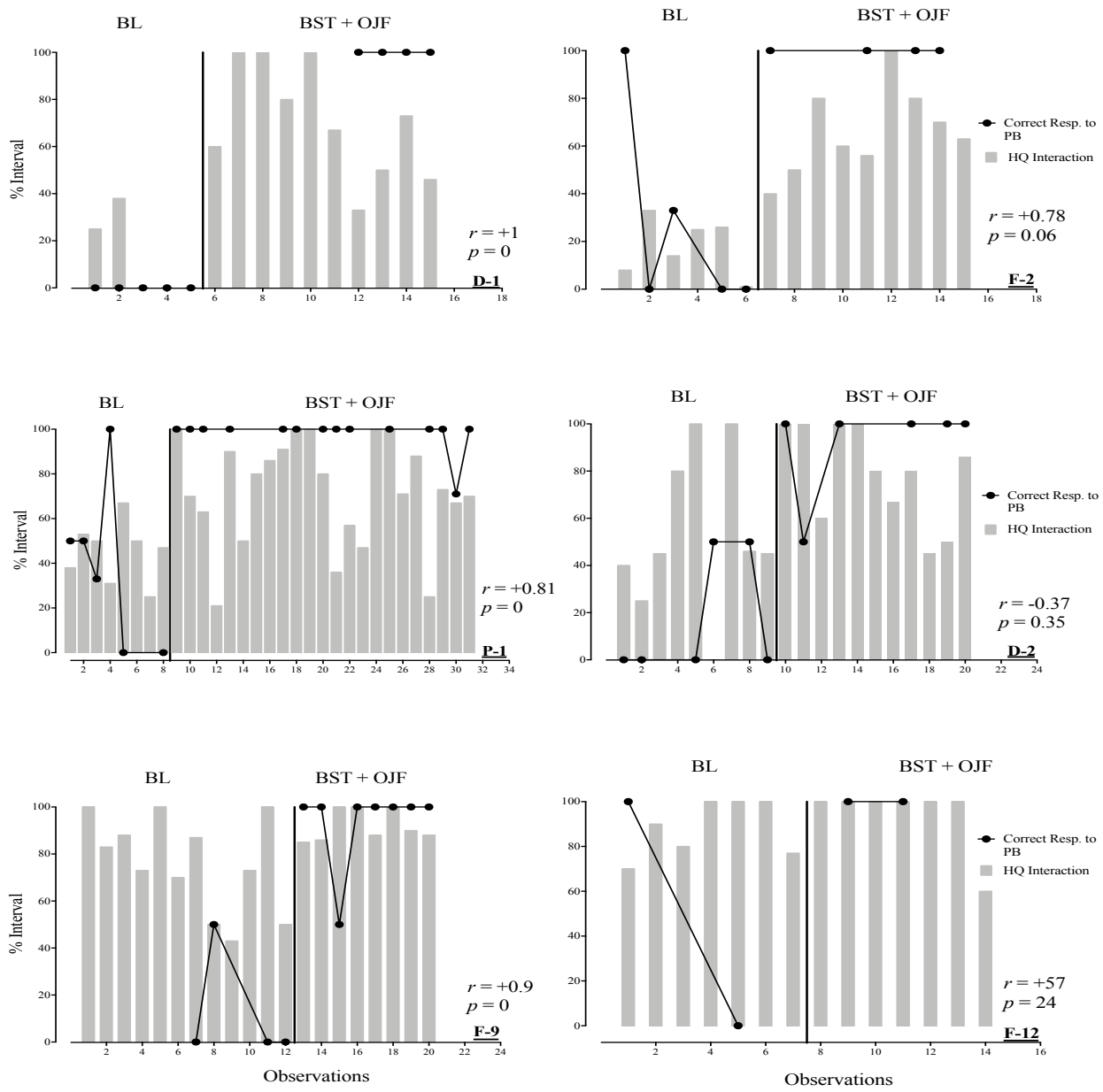


Figure 8. This figure depicts the percent intervals of correct responses to problem behavior (black circles) and staff high-quality interactions (gray bars). For these six homes and programs, correct responses to problem behavior are low or decreasing in baseline and high and stable in BST + OJF. Sessions missing data points are those in which staff did not have the opportunity to respond correctly or incorrectly to problem behavior. The *r* and *p* values are for staff correct responses to problem behavior (black circles).

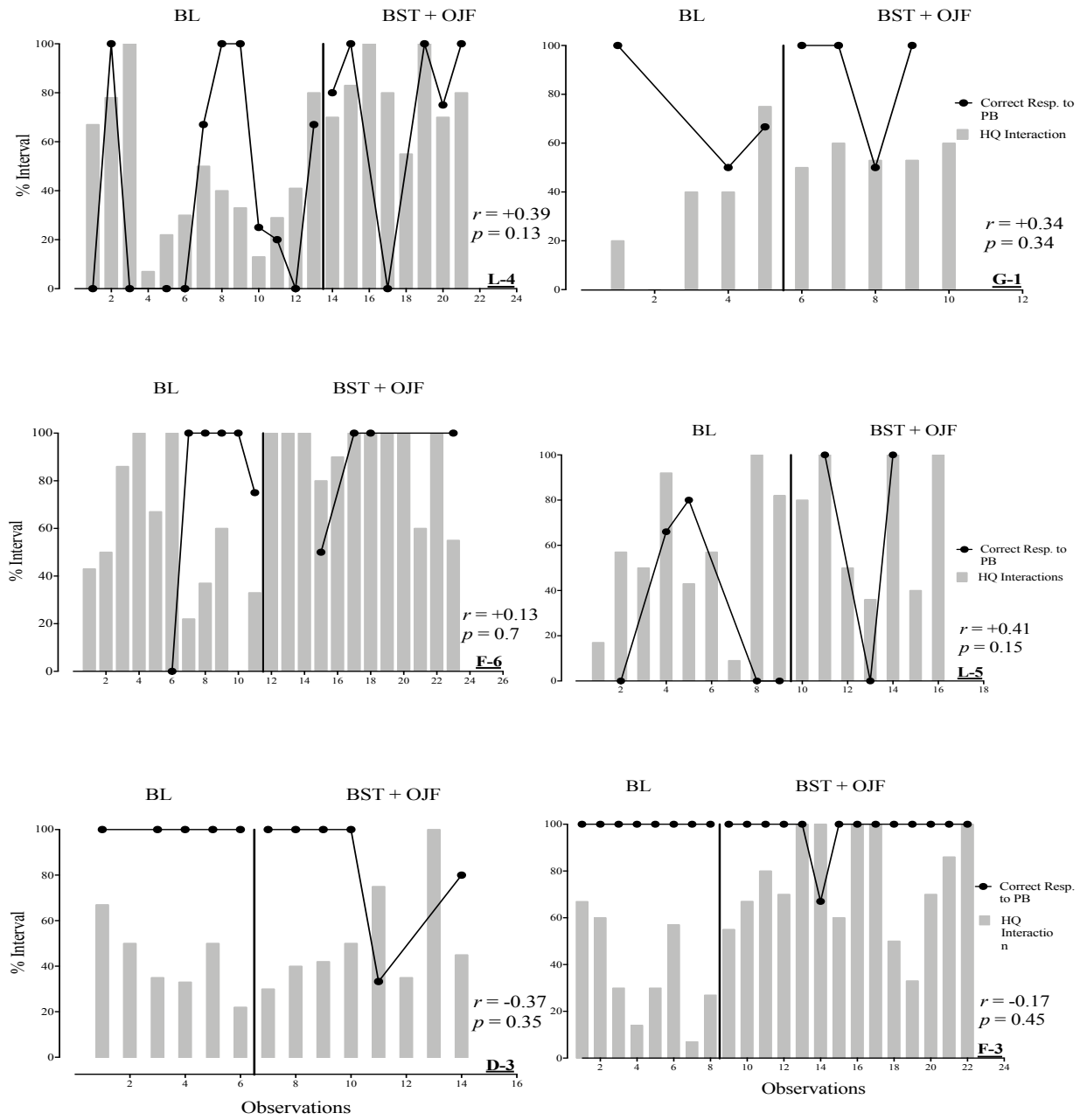


Figure 9. This figure depicts the percent intervals of correct responses to problem behavior (black circles) and staff high-quality interactions (gray bars). For these five homes and programs, baseline levels of correct responses to problem behavior are similar to levels in BST + OJF. Sessions missing data points are those in which staff did not have the opportunity to respond correctly or incorrectly to problem behavior. The *r* and *p* values are for staff correct responses to problem behavior (black circles).

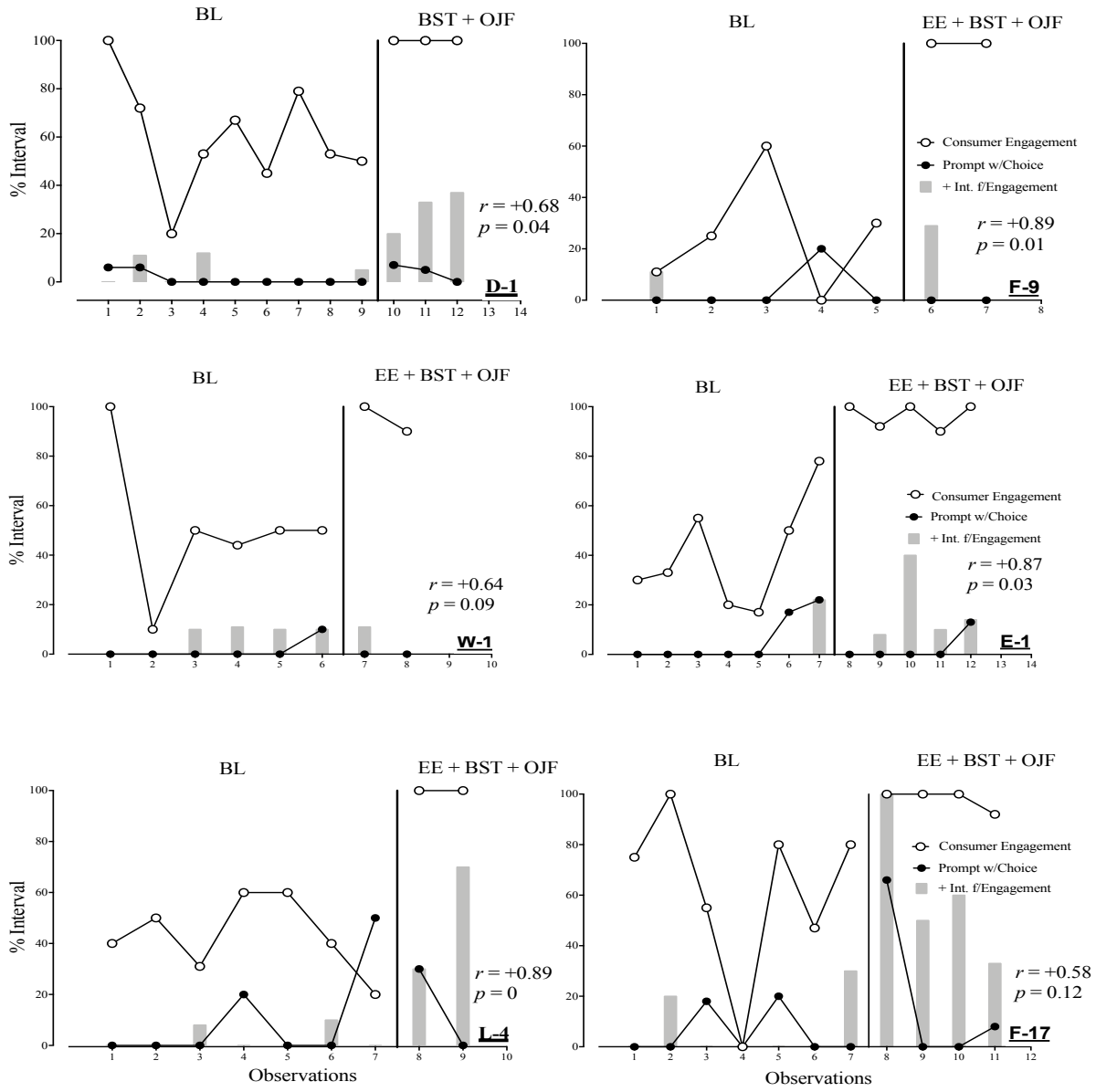


Figure 10. This figure depicts the percent intervals of staff prompts with choice (black circles), consumer engagement (open white circles), and staff positive interactions for engagement (gray bars). For these six homes and programs, there was an increase in consumer engagement from baseline to BST+OJF (and EE in the homes). EE was implemented only in homes for which additional preferred items and activities were purchased. The *r* and *p* values are for consumer engagement (open white circles).

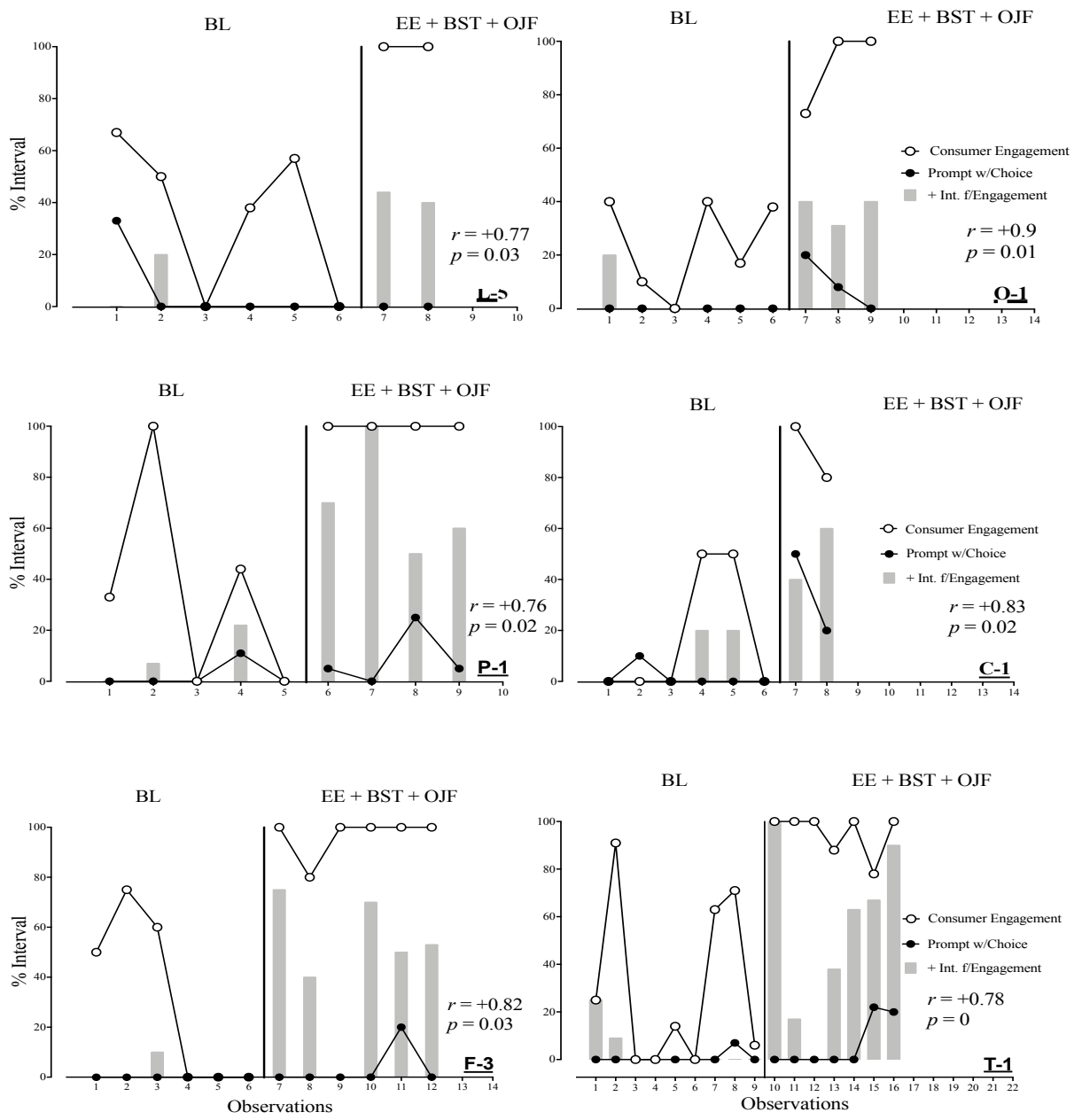


Figure 11. This figure depicts the percent intervals of staff prompts with choice (black circles), consumer engagement (open white circles), and staff positive interactions for engagement (gray bars). For these six homes, there was an increase in consumer engagement from baseline to EE+BST+OJF. The *r* and *p* values are for consumer engagement (open white circles).

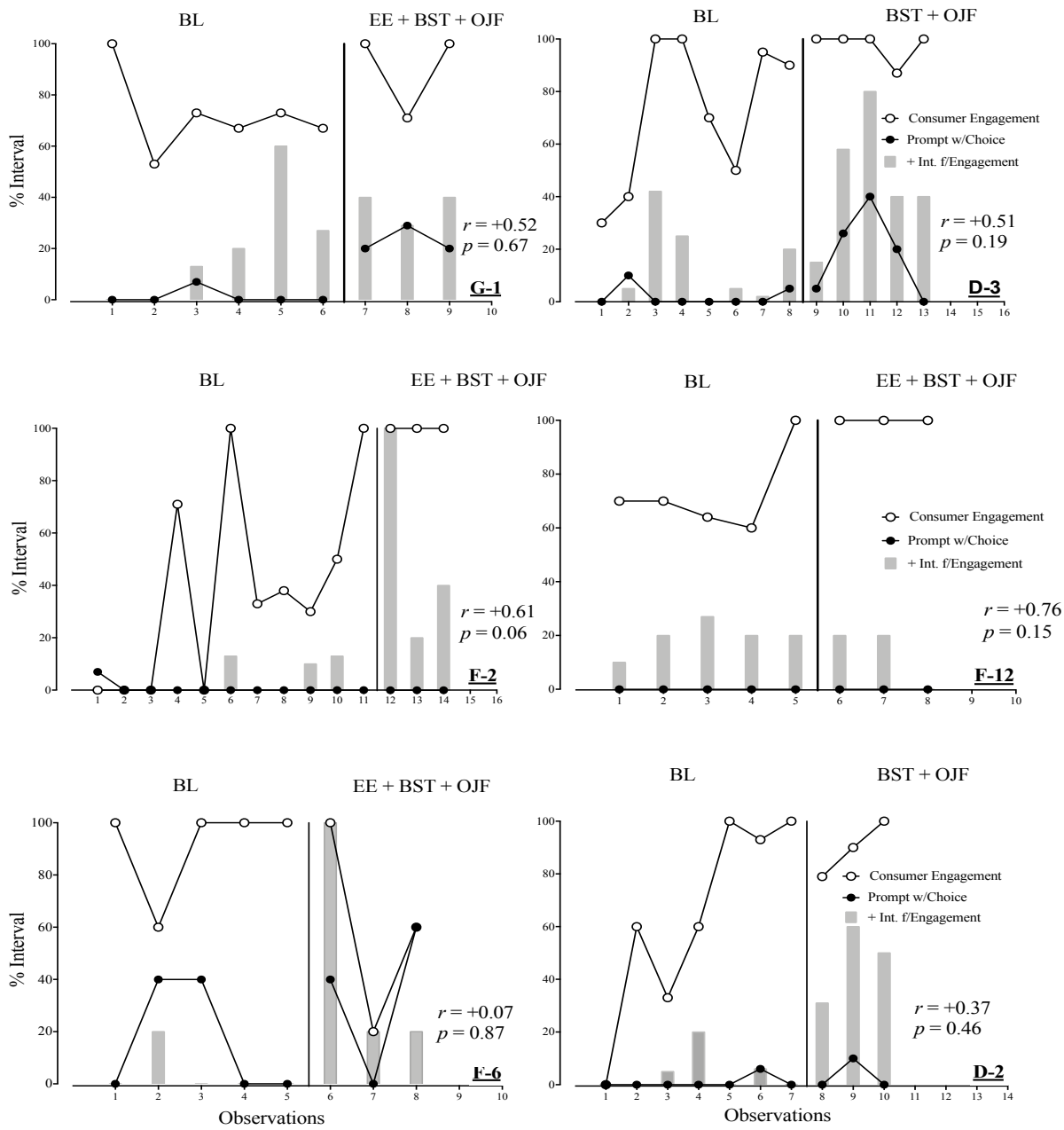


Figure 12. This figure depicts the percent intervals of staff prompts with choice (black circles), consumer engagement (open white circles), and staff positive interactions for engagement (gray bars). These six homes and programs did not show robust effects from baseline to BST+OJF (and EE in the homes). EE was implemented only in homes for which additional preferred items and activities were purchased. The *r* and *p* values are for consumer engagement (open white circles).

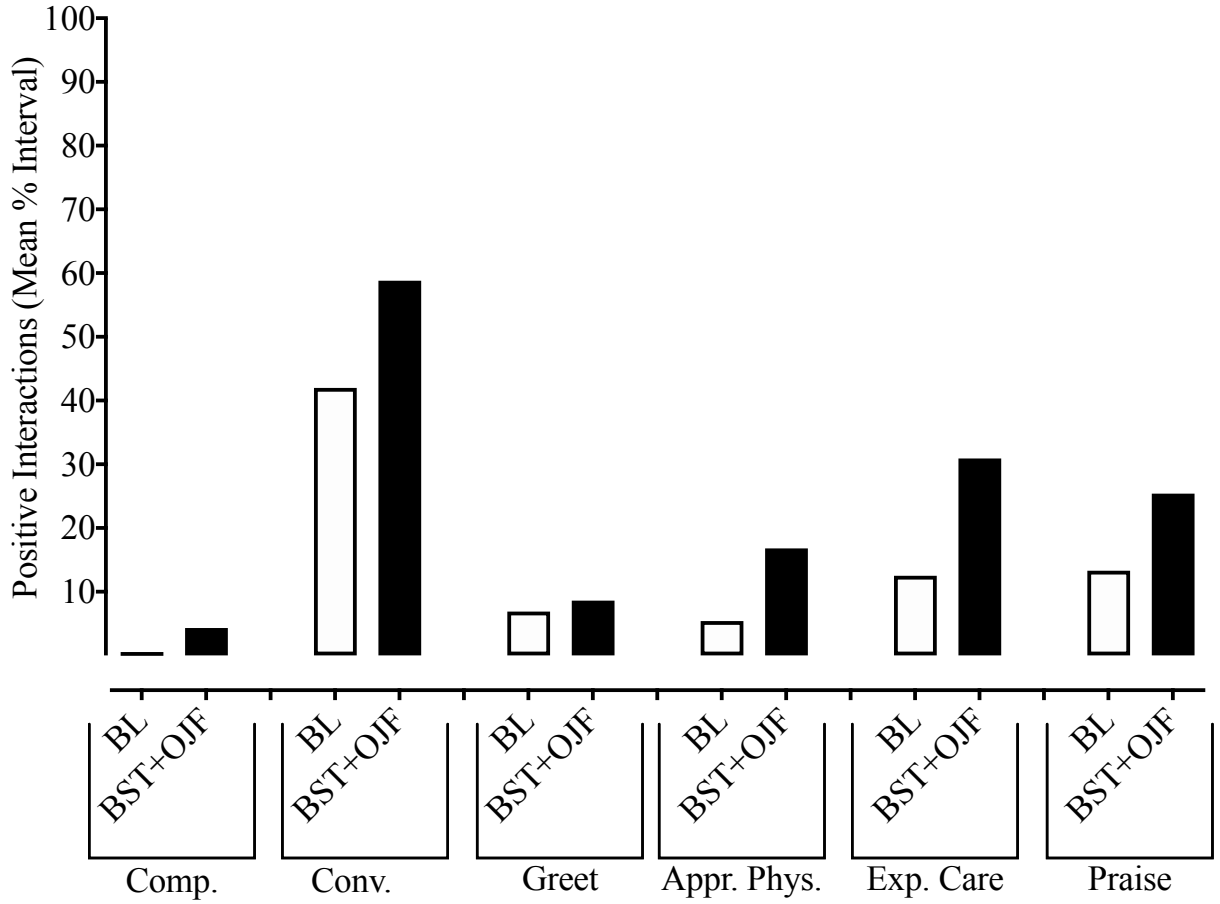


Figure 13. This figure depicts the mean percentage intervals of the different positive interaction types in baseline and BST + OJF for 19 homes and programs.

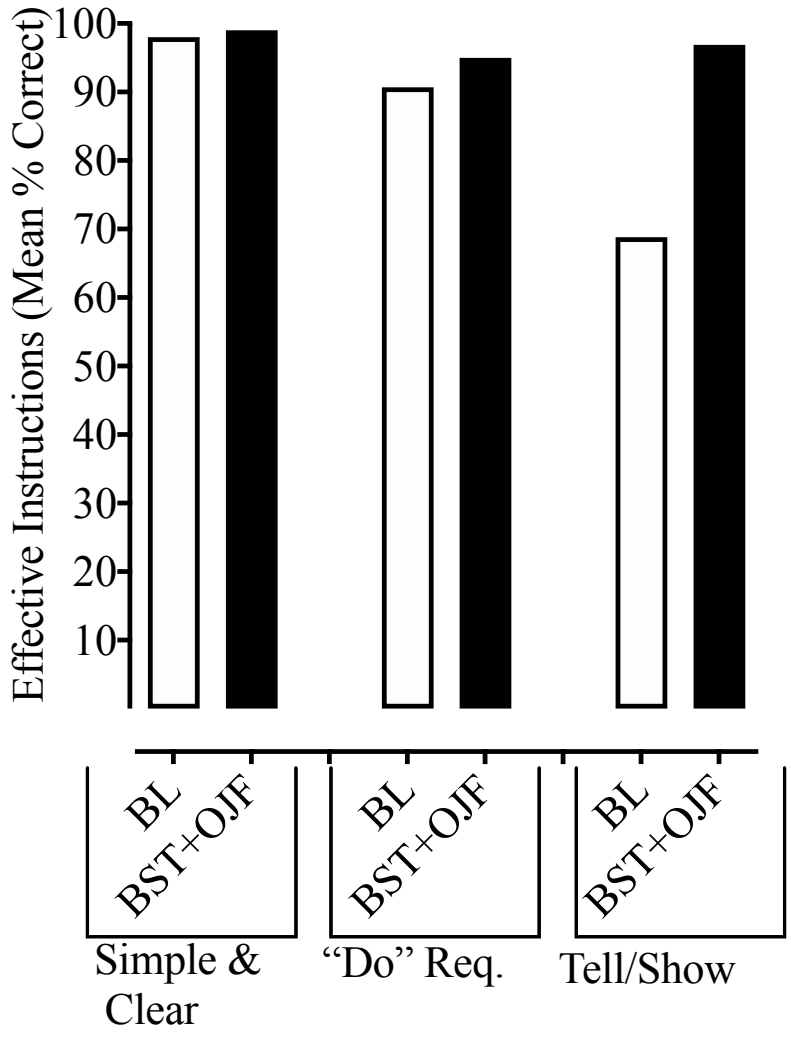


Figure 14. This figure depicts the mean percentage of correct instruction elements in baseline and BST + OJF for 18 homes and programs.

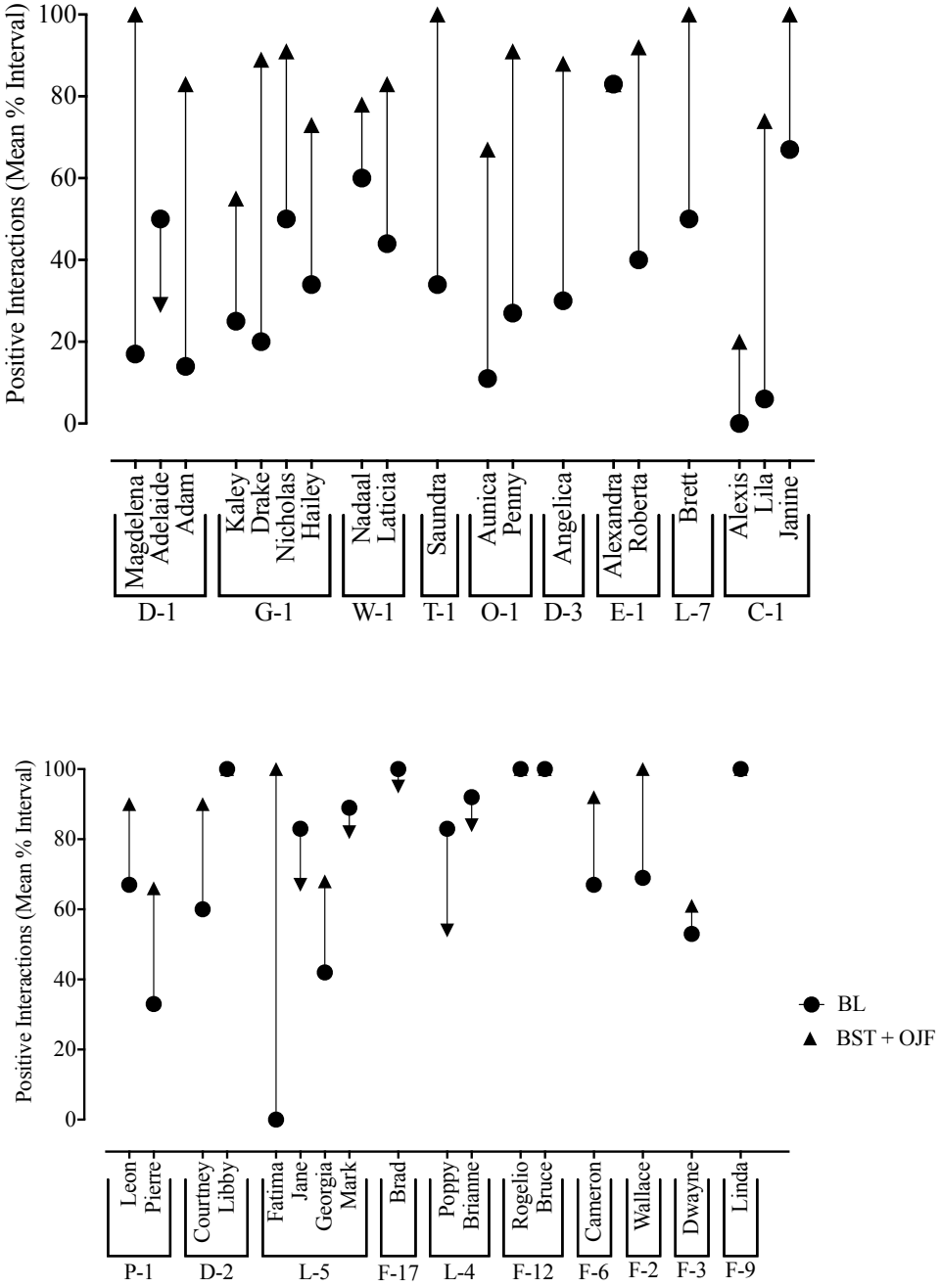


Figure 15. This figure depicts the mean percentage intervals of overall positive interactions for individual staff in baseline and BST + OJF. The first and second panels depict data for 36 staff in 19 homes and programs. The upside traingles depict increases and the downside triangles depict decreases from baseline to BST + OJF.

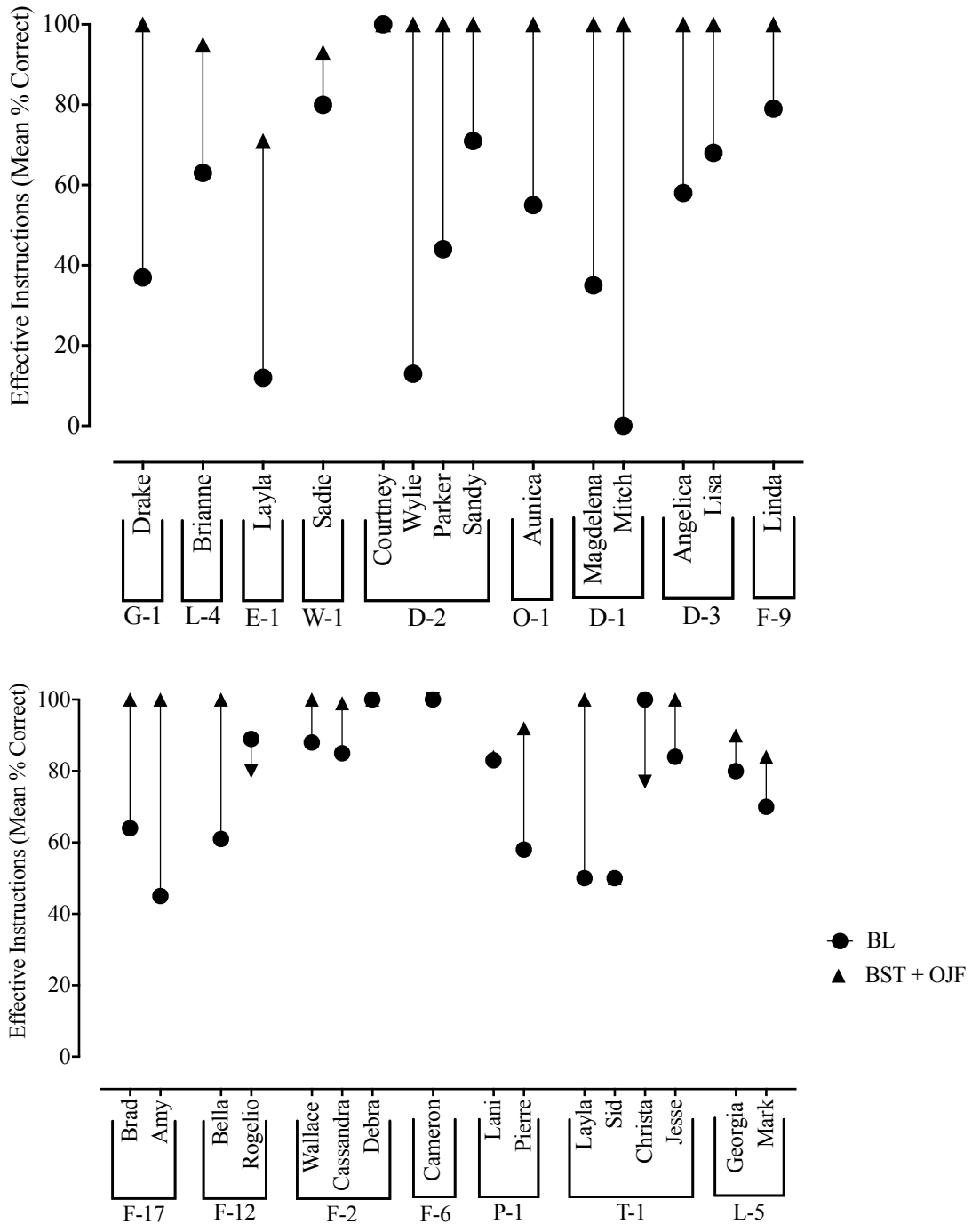


Figure 16. This figure depicts the mean percentage intervals of effective instructions for individual staff in baseline and BST + OJF. The first and second panels depict data for 30 staff in 16 homes and programs. The upside traingles depict increases and the downside triangles depict decreases from baseline to BST + OJF.

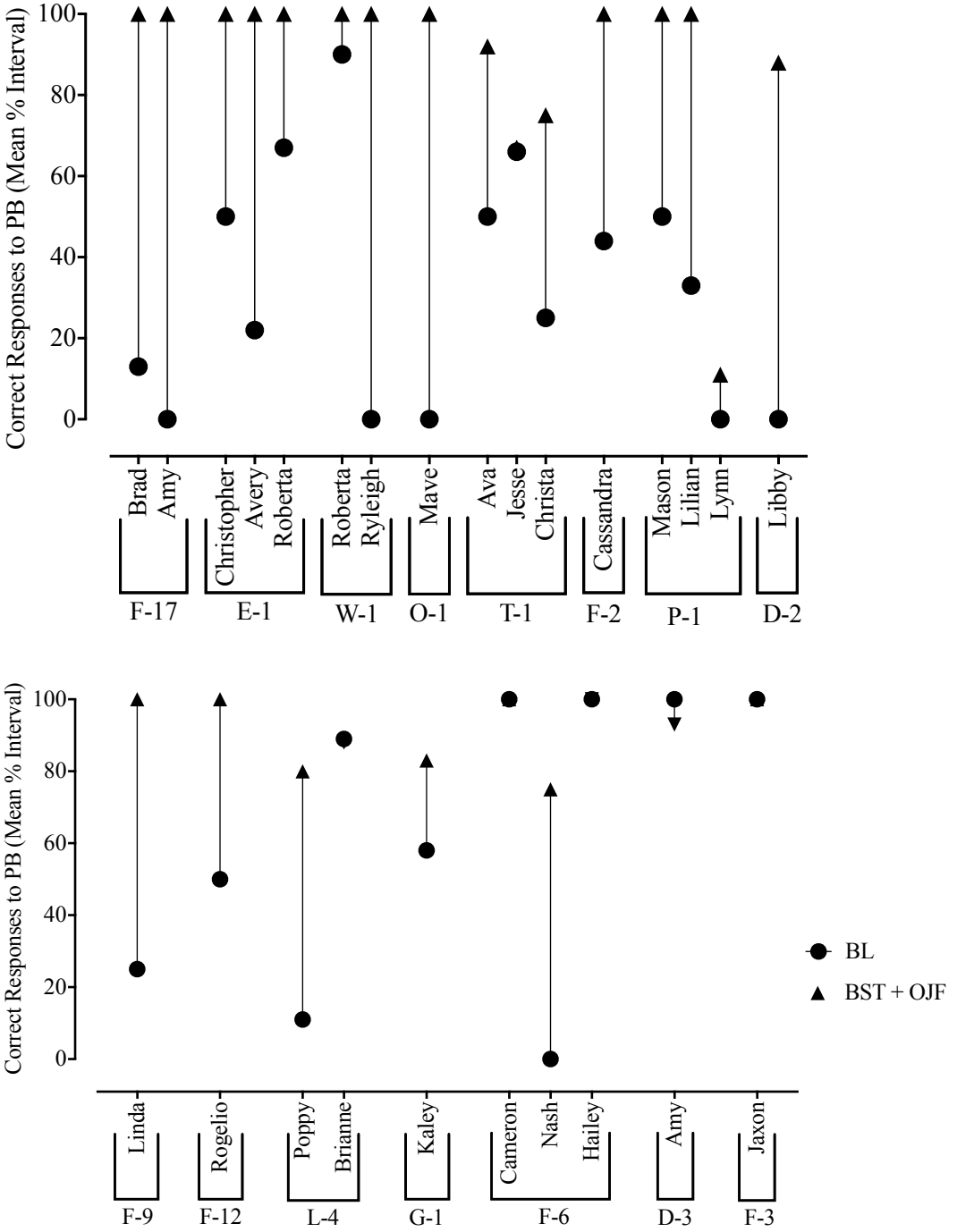


Figure 17. This figure depicts the mean percentage intervals of correct responses to problem behavior for individual staff in baseline and BST + OJF. The first and second panels depict data for 26 staff in 15 homes and programs. The upside traingles depict increases and the downside triangles depict decreases from baseline to BST + OJF.

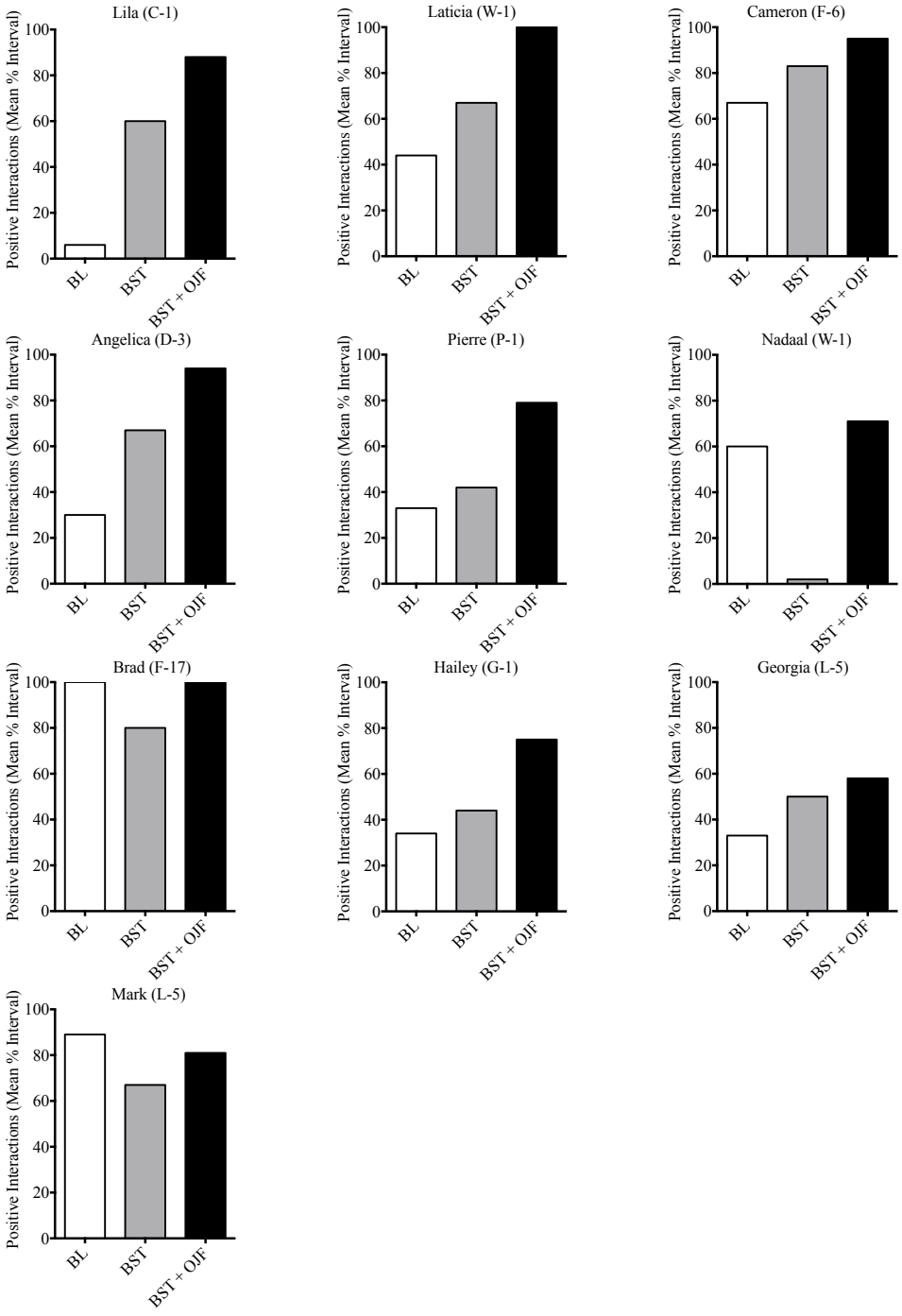


Figure 18. This figure depicts the mean percentage intervals of positive interactions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for 10 staff for whom there was an increase from BST to BST + OJF.

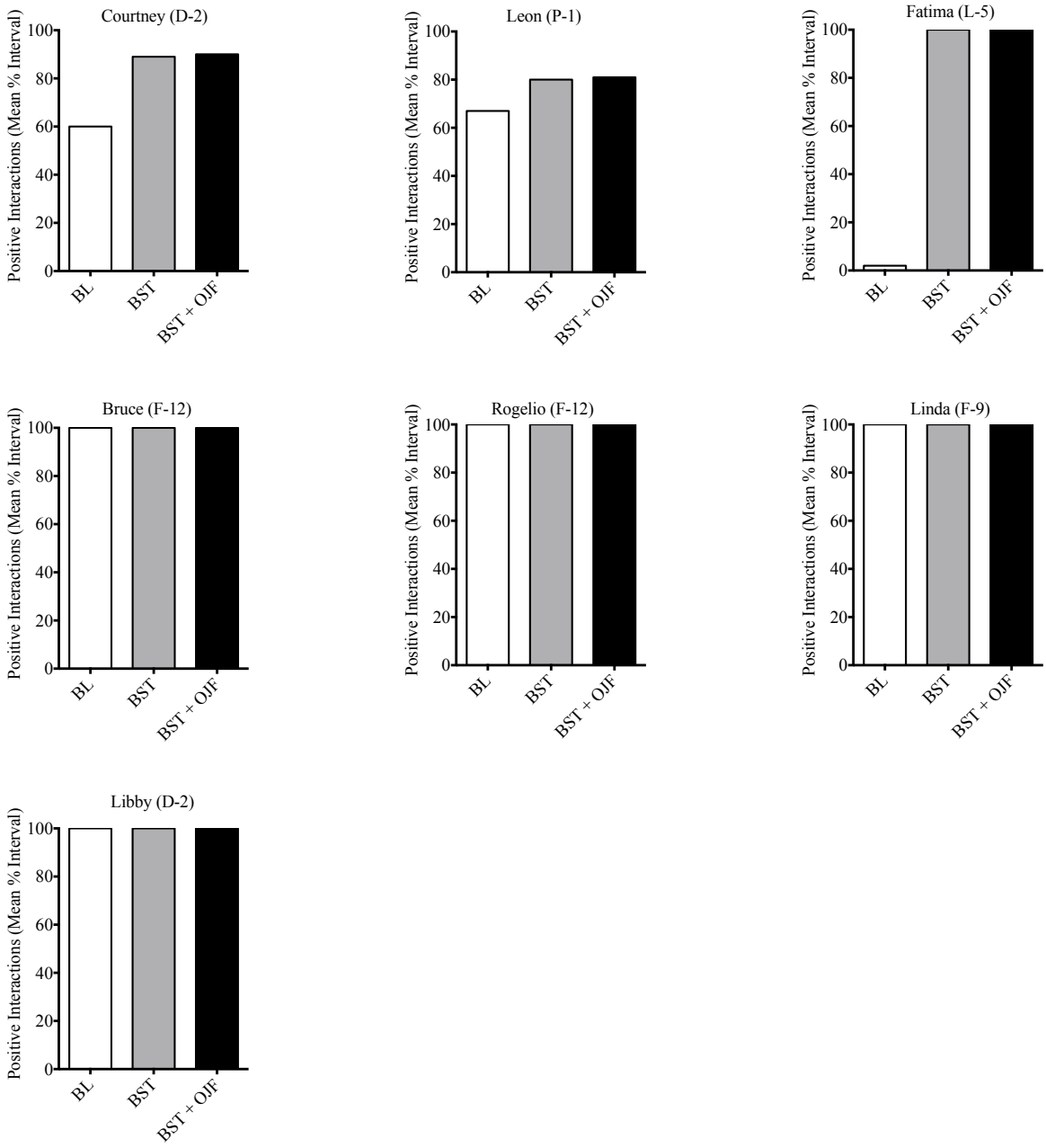


Figure 19. This figure depicts the mean percentage intervals of positive interactions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for seven staff for whom there was no change from BST to BST + OJF.

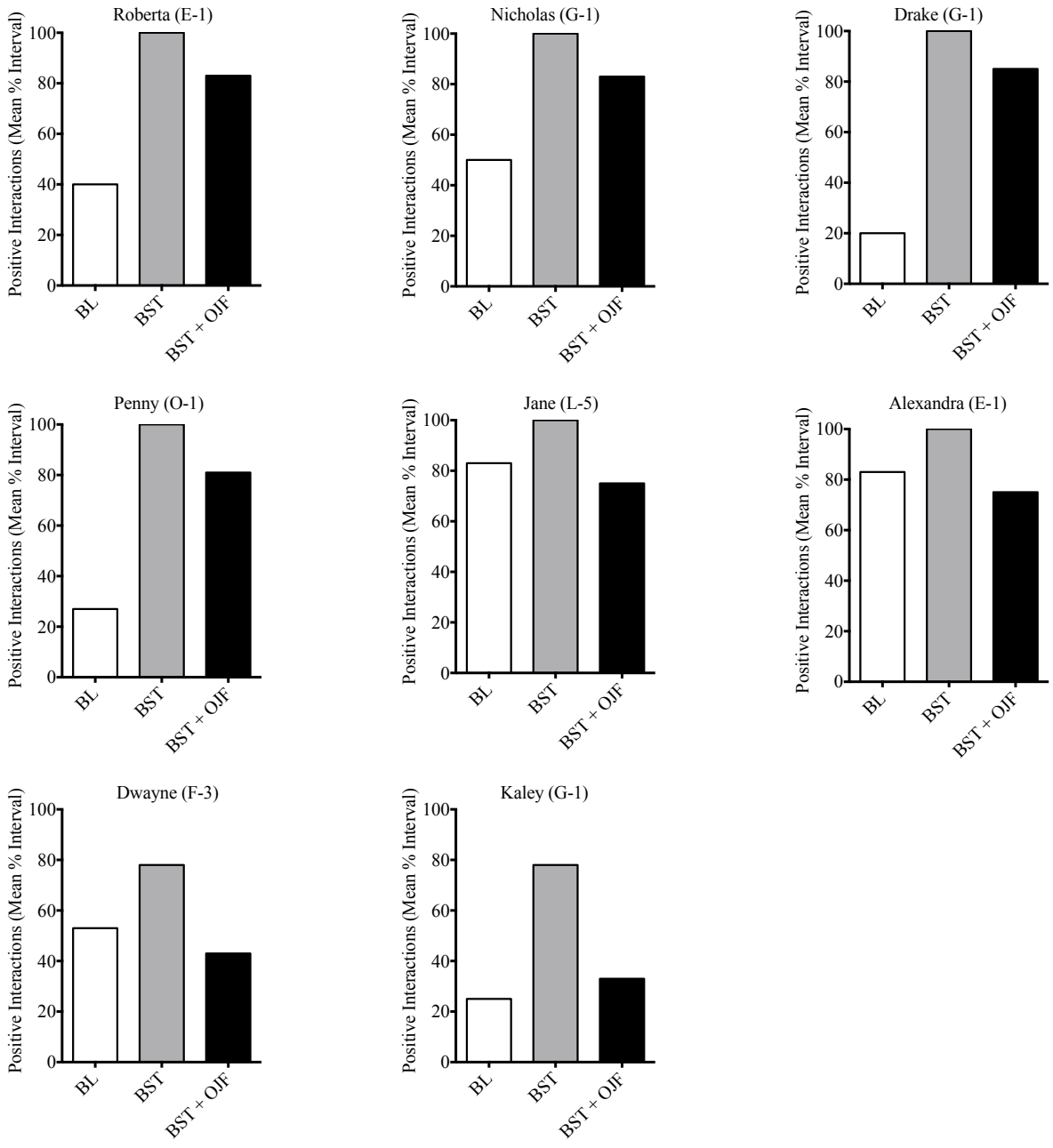


Figure 20. This figure depicts the mean percentage intervals of positive interactions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for eight staff for whom there was a decrease from BST to BST + OJF.

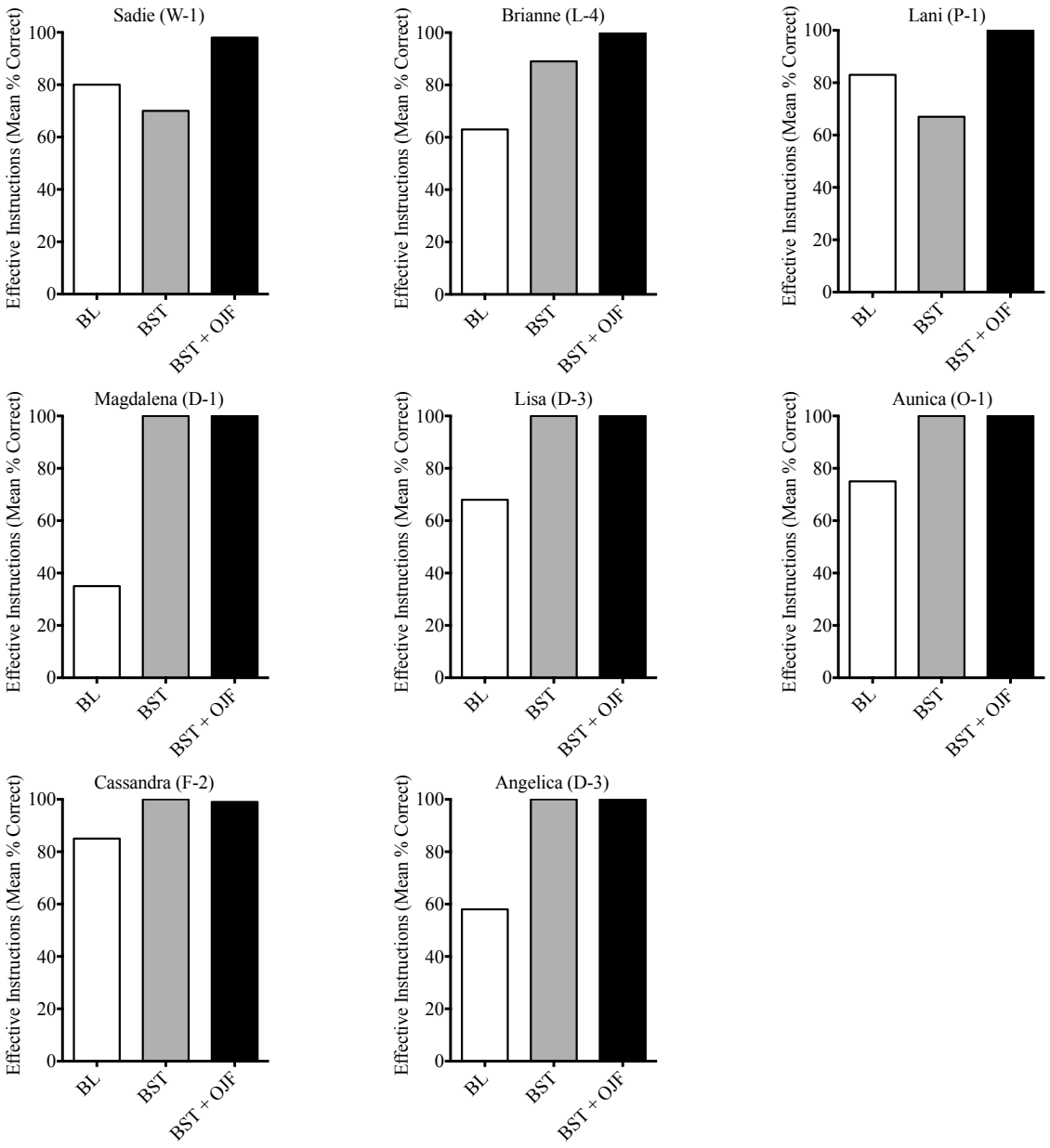


Figure 21. This figure depicts the mean percentage of correct instructions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for eight staff for whom there was an increase or no change from BST to BST + OJF.

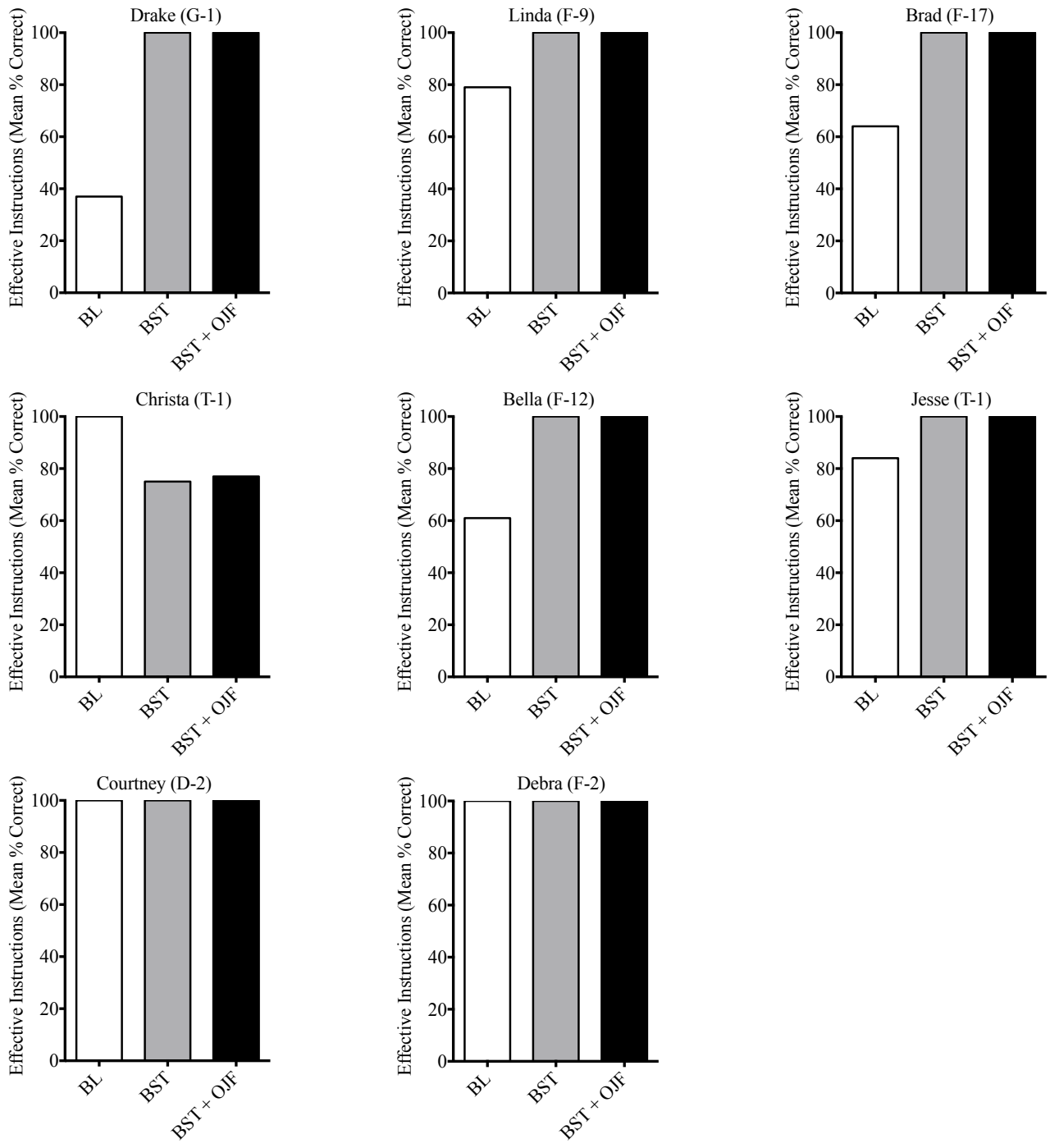


Figure 22. This figure depicts the mean percentage of correct instructions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for eight staff for whom there was no change from BST to BST + OJF.

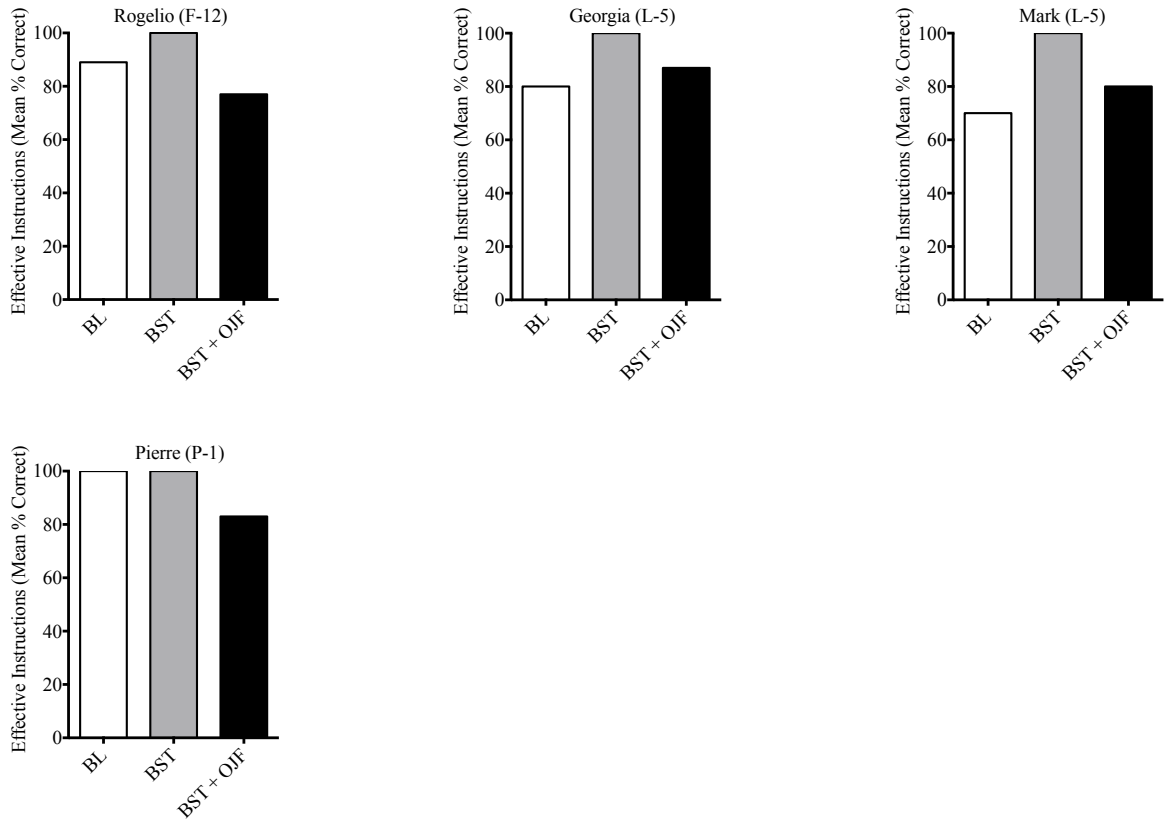


Figure 23. This figure depicts the mean percentage of correct instructions for individual staff in baseline, BST, and BST + OJF. These graphs depict data for four staff for whom there was a decrease from BST to BST + OJF.

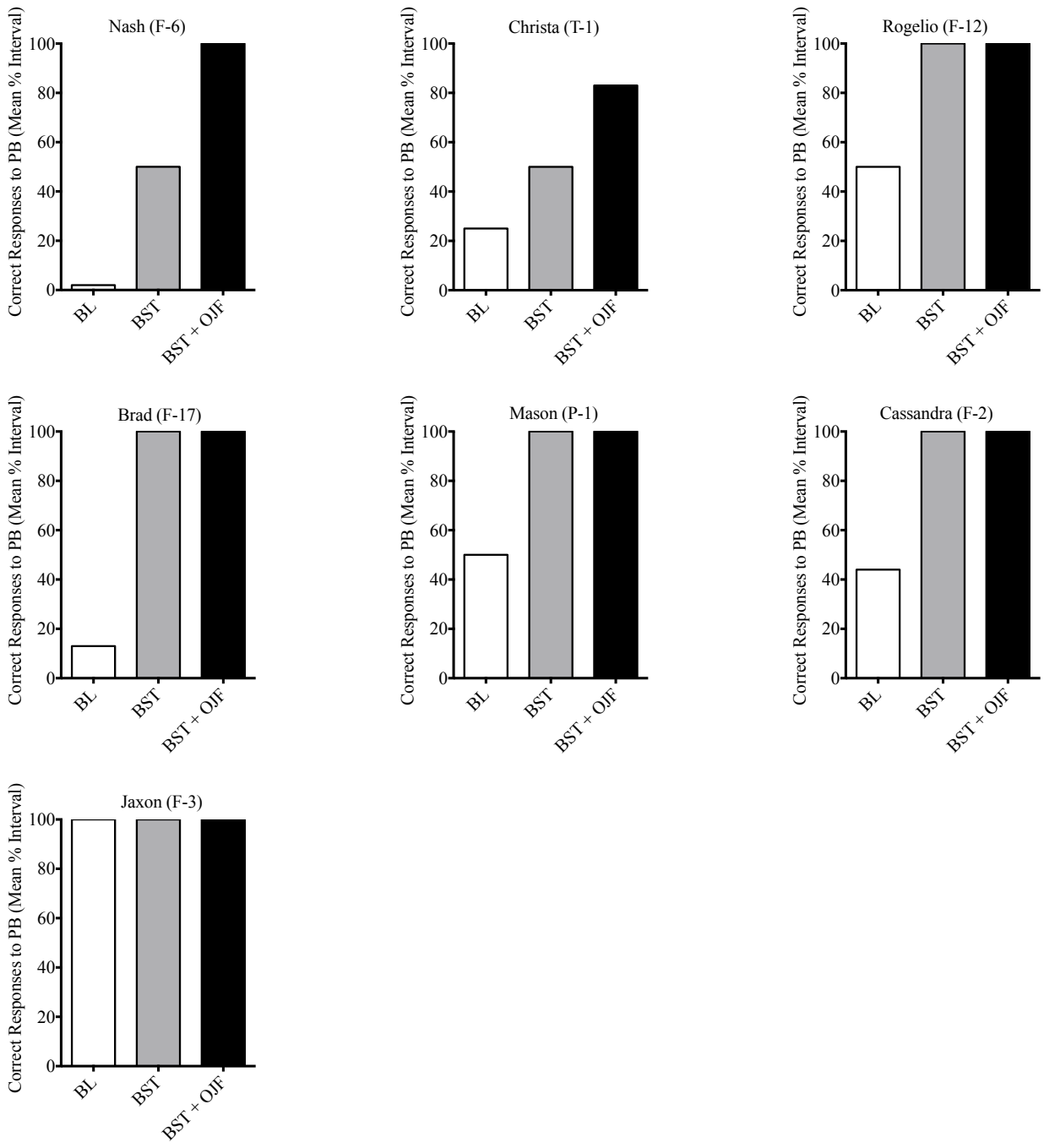


Figure 24. This figure depicts the mean percentage intervals of correct responses to problem behavior for individual staff in baseline, BST, and BST + OJF. These graphs depict data for seven staff for whom there was an increase or no change from BST to BST + OJF.

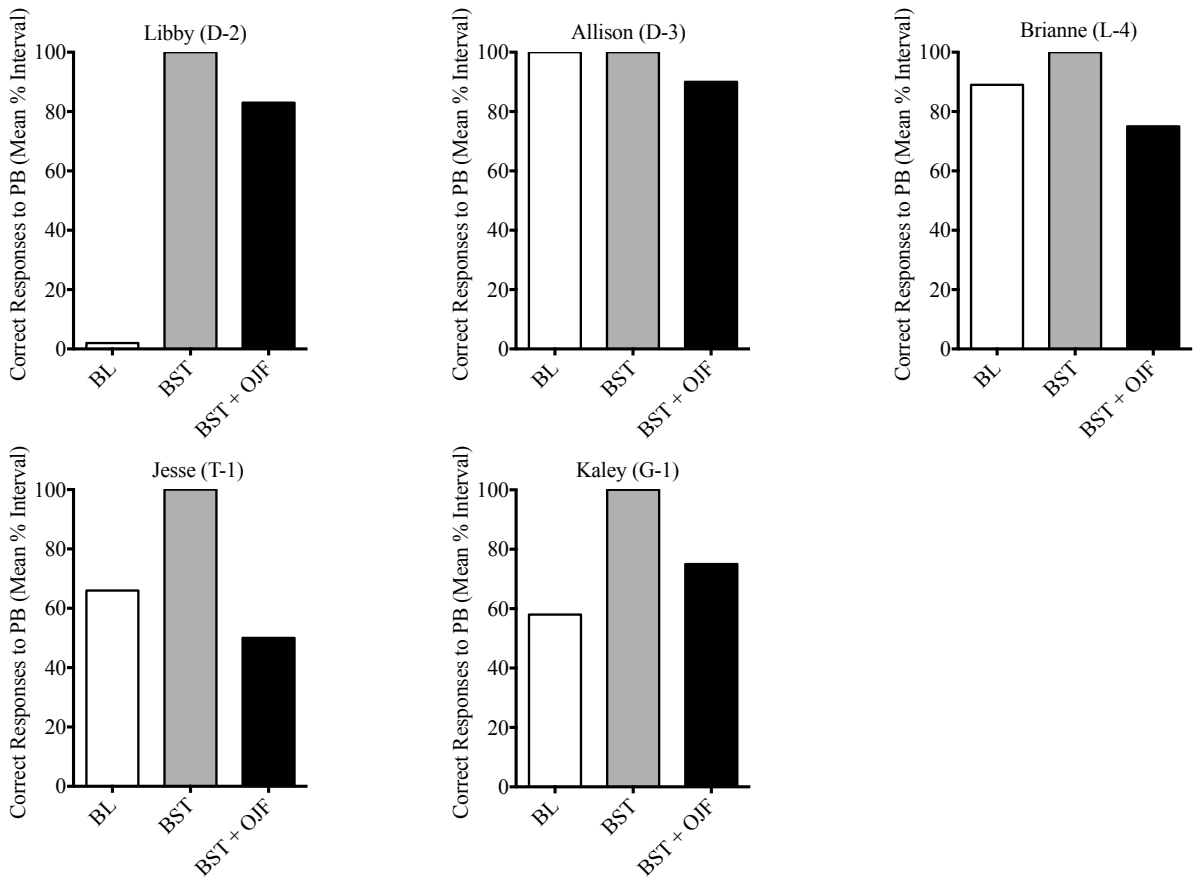


Figure 25. This figure depicts the mean percentage intervals of correct responses to problem behavior for individual staff in baseline, BST, and BST + OJF. These graphs depict data for five staff for whom there was a decrease from BST to BST + OJF.

Tables

Table 1
Simulation Modeling Analysis (SMA) Outcomes for Overall Positive Interactions

Program	Level-r	Level-p	Level-sig?	Visual Inspection	Decision
D-1	0.69	0.06	No	Yes	False Negative
G-1	0.68	0.01	Yes	Yes	True Positive
W-1	0.49	0.18	No	Yes	False Negative
T-1	0.54	0.03	Yes	Yes	True Positive
O-1	0.73	0.03	Yes	Yes	True Positive
D-3	0.74	0.02	Yes	Yes	True Positive
E-1	0.52	0.11	No	Yes	False Negative
L-7	0.64	0.16	No	?	NA
C-1	0.62	0.06	No	?	NA
P-1	0.32	0.26	No	?	NA
D-2	0.28	0.33	No	?	NA
L-5	0.52	0.08	No	?	NA
F-17	0.52	0.27	No	?	NA
L-4	-0.11	0.71	No	No	True Negative
F-12	0.43	0.11	No	No	True Negative
F-6	0.46	0.39	No	No	True Negative
F-2	-0.06	0.8	No	No	True Negative
F-3	0.21	0.31	No	No	True Negative
F-9	0.17	0.44	No	No	True Negative

This table depicts SMA outcomes for overall positive interactions for 19 homes and programs. The second and third columns depict *r* and *p* values, respectively. The fourth column depicts whether (i.e., yes or no) overall positive interaction outcomes are significant according to SMA. The fifth column depicts whether visual inspection suggested an effect (i.e., yes), an unclear effect (?), or no effect (i.e., no). The last column depicts the decision when SMA outcomes (fourth column) are compared to visual analysis outcomes (fifth column).

Table 2

Simulation Modeling Analysis (SMA) Outcomes for Effective Instructions

Program	Level-r	Level-p	Level-sig?	Visual Inspection	Decision
G-1	0.88	0.01	Yes	Yes	True Positive
L-4	0.92	0	Yes	Yes	True Positive
C-1	0.77	0	Yes	Yes	True Positive
E-1	0.93	0	Yes	Yes	True Positive
W-1	0.69	0.04	Yes	Yes	True Positive
D-2	0.48	0.08	No	Yes	False Negative
O-1	0.59	0.09	No	Yes	False Negative
D-1	0.91	0	Yes	Yes	True Positive
D-3	0.84	0.01	Yes	Yes	True Positive
F-9	0.34	0.2	No	No	True Negative
F-17	0.63	0.12	No	No	True Negative
F-12	0.27	0.24	No	No	True Negative
F-2	0.47	0.07	No	No	True Negative
F-3	-0.16	0.5	No	No	True Negative
F-6	-0.23	0.54	No	No	True Negative
P-1	0.37	0.2	No	No	True Negative
T-1	0.17	0.4	No	No	True Negative
L-5	0.36	0.06	No	No	True Negative

This table depicts SMA outcomes for effective instructions for 18 homes and programs. The second and third columns depict *r* and *p* values, respectively. The fourth column depicts whether (i.e., yes or no) effective instructions outcomes are significant according to SMA. The fifth column depicts whether visual inspection suggested an effect (i.e., yes) or no effect (i.e., no). The last column depicts the decision when SMA outcomes (fourth column) are compared to visual analysis outcomes (fifth column).

Table 3

Simulation Modeling Analysis (SMA) Outcomes for Staff Correct Responses to PB

Program	Level-r	Level-p	Level-sig?	Visual Inspection	Decision
F-17	0.96	0	Yes	Yes	True Positive
E-1	0.69	0.1	No	Yes	False Negative
W-1	0.53	0.32	No	Yes	False Negative
O-1	0.69	0.13	No	Yes	False Negative
T-1	0.37	0.09	No	Yes	False Negative
D-1	1	0	Yes	Yes	True Positive
F-2	0.78	0.06	No	Yes	False Negative
P-1	0.81	0	Yes	Yes	True Positive
D-2	0.87	0	Yes	Yes	True Positive
F-9	0.9	0	Yes	Yes	True Positive
F-12	0.57	0.24	No	Yes	False Negative
L-4	0.39	0.13	No	No	True Negative
G-1	0.34	0.34	No	No	True Negative
F-6	0.13	0.7	No	No	True Negative
L-5	0.41	0.15	No	No	True Negative
D-3	-0.37	0.35	No	No	True Negative
F-3	-0.17	0.45	No	No	True Negative

This table depicts SMA outcomes for staff correct responses to problem behavior for 17 homes and programs. The second and third columns depict *r* and *p* values, respectively. The fourth column depicts whether (i.e., yes or no) correct responses to problem behavior outcomes are significant according to SMA. The fifth column depicts whether visual inspection suggested an effect (i.e., yes) or no effect (i.e., no). The last column depicts the decision when SMA outcomes (fourth column) are compared to visual analysis outcomes (fifth column).

Table 4

Simulation Modeling Analysis Outcomes for Consumer Engagement

Program	Level-r	Level-p	Level-sig?	Visual Inspection	Decision
D-1	0.68	0.04	Yes	Yes	True Positive
F-9	0.89	0.01	Yes	Yes	True Positive
W-1	0.64	0.09	No	Yes	False Negative
E-1	0.87	0.03	Yes	Yes	True Positive
L-4	0.89	0	Yes	Yes	True Positive
F-17	0.58	0.13	No	Yes	False Negative
L-5	0.77	0.03	Yes	Yes	True Positive
O-1	0.9	0.01	Yes	Yes	True Positive
P-1	0.76	0.02	Yes	Yes	True Positive
C-1	0.83	0.02	Yes	Yes	True Positive
F-3	0.82	0.03	Yes	Yes	True Positive
T-1	0.78	0	Yes	Yes	True Positive
G-1	0.52	0.67	No	No	True Negative
D-3	0.51	0.19	No	No	True Negative
F-2	0.61	0.06	No	No	True Negative
F-12	0.76	0.15	No	No	True Negative
F-6	0.07	0.87	No	No	True Negative
D-2	0.37	0.46	No	No	True Negative

This table depicts SMA outcomes for consumer engagement for 18 homes and programs. The second and third columns depict *r* and *p* values, respectively. The fourth column depicts whether (i.e., yes or no) consumer engagement outcomes are significant according to SMA. The fifth column depicts whether visual inspection suggested an effect (i.e., yes) or no effect (i.e., no). The last column depicts the decision when SMA outcomes (fourth column) are compared to visual analysis outcomes (fifth column).

Table 5

Mean Change (% Interval) Overall Positive Interactions from BL to BST + OJF

Program	Mean % (BL)	Mean % (BST+OJF)	Mean % Change
D-1	20	69	49
G-1	31	77	46
W-1	46	76	30
T-1	30	65	35
O-1	43	85	42
D-3	35	92	57
E-1	40	77	37
L-7	50	98	48
C-1	28	72	44
P-1	48	77	19
D-2	72	78	6
L-5	46	77	31
F-17	61	96	35
L-4	86	82	**-4**
F-12	80	100	20
F-6	83	96	13
F-2	67	63	**-4**
F-3	52	66	14
F-9	77	88	11

This table depicts the mean percentage intervals of overall staff positive interactions in baseline and BST + OJF phases. The last column depicts the percent interval mean change of overall staff positive interactions from baseline to BST + OJF across 19 homes and programs. The bold numbers in the last column depict programs in which there was a decrease from baseline to BST + OJF.

Table 6

Mean Change (% Correct) Effective Instructions from BL to BST + OJF

Program	Mean % (BL)	Mean % (BST + OJF)	Mean % Change
G-1	37	94	57
L-4	56	97	41
C-1	33	96	63
E-1	22	93	72
W-1	39	89	50
D-2	63	90	27
O-1	53	95	42
D-1	23	100	77
D-3	67	96	29
F-9	83	96	13
F-17	58	100	42
F-12	60	84	24
F-2	66	97	34
F-3	100	97	**-3**
F-6	100	94	**-6**
P-1	71	88	18
T-1	79	84	5
L-5	71	87	16

This table depicts the mean percentages of effective instructions across baseline and BST + OJF. The last column depicts the percentage mean change of effective instructions from baseline to BST + OJF across 18 homes and programs. The bold numbers in the last column depict programs in which there was a decrease from baseline to BST + OJF.

Table 7

Mean Change (% Interval) Correct Responses to Problem Behavior and High-Quality Interactions from Baseline to BST + OJF

	Correct Resp. to Problem Bx (%)			High-Quality Interactions (%)		
Program	Mean (BL)	Mean (BST+OJF)	Mean Change	Mean (BL)	Mean (BST+OJF)	Mean Change
F-17	10	100	90	40	72	32
E-1	56	98	42	34	72	38
W-1	56	90	34	63	70	7
O-1	0	83	83	85	63	**-22**
T-1	47	76	32	40	64	24
D-1	0	100	100	33	71	38
F-2	27	100	73	18	67	49
P-1	39	97	58	45	78	33
D-2	17	92	75	53	79	26
F-9	13	94	81	76	92	16
F-12	50	100	50	88	94	6
L-4	40	76	36	45	80	35
G-1	72	88	16	35	55	20
F-6	79	88	9	54	90	36
L-5	29	67	38	56	72	16
D-3	100	86	**-14**	43	52	9
F-3	100	98	**-2**	37	77	40

This table depicts the mean percentages of overall staff correct responses to problem behavior and high-quality interactions in baseline and BST + OJF. The fourth and last columns depict the percentage mean change of overall staff correct responses to problem behavior and staff high-quality interactions, respectively, from baseline to BST + OJF across 17 homes and programs. The bold numbers in the fourth and last columns depict programs in which there were decreases from baseline to BST + OJF.

Table 8

Mean Change (% Interval) Staff Prompts w/Choice, Consumer Engagement, and Staff Positive Interactions for Engagement from BL to BST + OJF (and EE in Some Homes)

	Staff Prompts w/ Choice (%)			Consumer Engagement (%)			Pos. Interaction f/ Engagement (%)		
Program	Mean (BL)	Mean (BST+ OJF)	Mean Change	Mean (BL)	Mean (BST+ OJF)	Mean Change	Mean (BL)	Mean (BST+ OJF)	Mean Change
D-1	1	4	3	60	100	40	3	30	27
F-9	4	0	**-4**	25	100	75	2	16	14
W-1	2	0	**-2**	51	95	44	7	6	**-1**
E-1	6	3	**-3**	40	96	56	3	29	26
L-4	10	15	5	43	100	57	9	50	41
F-17	5	19	14	62	98	36	7	61	54
L-5	6	0	**-6**	35	100	65	3	42	39
O-1	0	9	9	24	91	67	3	37	34
P-1	2	9	7	35	100	65	6	70	64
C-1	2	35	33	17	90	73	7	59	50
F-3	0	3	3	31	97	66	2	48	46
T-1	1	6	5	30	95	65	4	45	41
G-1	1	23	22	72	90	18	20	30	10
D-3	2	18	16	72	97	25	12	47	35
F-2	1	0	**-1**	38	100	62	3	53	50
F-12	0	0	**0**	73	100	27	19	20	1
F-6	16	33	17	92	60	**-32**	4	47	43
D-2	1	3	2	64	90	26	4	47	43

This table depicts the mean percentages of staff prompts with choice, consumer engagement, and staff positive interactions for engagement in baseline and BST + OJF (and EE in some homes). The fourth, seventh, and last columns depict the percentage mean change of staff prompts with choice, consumer engagement, and staff positive interactions for engagement, respectively, from baseline to BST + OJF (and EE in some homes) across 18 homes and programs. The bold numbers in the fourth, seventh, and last columns depict programs in which there was a decrease or no change from baseline to BST + OJF (and EE in some homes).

Table 9

Mean (% Interval) Positive Interaction Types in BL and BST + OJF

	Comp. (%)		Conv. (%)		Greet (%)		Appr. Phys. (%)		Exp. Care (%)		Praise (%)	
Prog.	Mean (BL)	Mean (BST+ OJF)	Mean (BL)	Mean (BST+ OJF)	Mean (BL)	Mean (BST+ OJF)	Mean (BL)	Mean (BST+ OJF)	Mean (BL)	Mean (BST+ OJF)	Mean (BL)	Mean (BST+ OJF)
D-1	0	7	19	56	7	**0**	0	1	6	36	0	16
G-1	0	4	23	45	0	13	3	37	13	35	20	15
W-1	0	3	37	49	6	**1**	0	9	3	33	13	31
T-1	3	**2**	28	48	5	23	13	0	10	32	6	17
O-1	0	4	19	60	2	15	2	8	8	46	0	9
D-3	3	9	24	62	12	**1**	7	14	3	32	6	32
E-1	0	**0**	25	39	0	5	6	29	13	39	12	36
L-7	0	9	47	85	3	**0**	0	**0**	8	13	0	17
C-1	0	1	27	47	0	4	12	28	0	32	0	9
P-1	3	12	49	61	12	15	11	12	19	36	11	20
D-2	0	2	67	48	2	**1**	0	1	1	32	29	**28**
L-5	0	**0**	38	53	2	3	4	19	14	19	12	29
F-17	0	3	33	83	0	3	6	10	21	35	25	50
L-4	0	5	68	**52**	0	12	6	47	38	45	38	**13**
F-12	0	13	73	86	16	27	3	6	13	28	11	51
F-6	0	**0**	83	83	17	18	6	19	6	19	34	**27**
F-2	0	4	52	**46**	48	**11**	4	**2**	12	14	4	**12**
F-3	0	4	43	57	3	**1**	16	**13**	21	13	10	**9**
F-9	0	**0**	63	57	0	4	0	29	29	48	12	35

This table depicts the mean percentage intervals of different positive interaction types in baseline and BST + OJF for 19 homes and programs. The bold numbers depict programs in which there was a decrease or no change in the mean percentage intervals of different positive interaction types from baseline to BST + OJF.

Table 10

Mean (% Correct) Different Instruction Elements in BL and BST + OJF

	Simple & Clear (%)		"Do" Request (%)		Tell/Show (%)	
Program	Mean (BL)	Mean (BST +OJF)	Mean (BL)	Mean (BST + OJF)	Mean (BL)	Mean (BST + OJF)
G-1	100	**100**	79	100	54	94
L-4	100	**100**	95	98	56	99
C-1	100	**100**	100	**99**	33	97
E-1	100	**99**	75	93	22	99
W-1	100	**100**	80	94	39	96
D-2	100	**100**	88	94	65	97
O-1	87	100	90	95	87	100
D-1	91	100	75	100	61	100
D-3	100	**100**	93	96	73	100
F-9	100	**100**	95	100	83	96
F-17	100	**100**	78	100	80	100
F-12	100	**100**	90	**85**	82	89
F-2	100	**100**	95	99	80	98
F-3	100	**100**	100	**100**	100	**98**
F-6	100	**100**	100	**94**	100	**100**
P-1	100	**100**	100	**97**	71	88
T-1	88	99	100	**93**	79	94
L-5	100	**100**	99	**89**	73	99

This table depicts the mean percentage correct of effective instruction elements in baseline and BST + OJF for 18 homes and programs. The bold numbers depict programs in which there was a decrease or no change in the mean percentage correct instruction elements from baseline to BST + OJF.

Appendix A

Positive Interactions Competency Checklist

Home: _____ Staff Observed: _____ Date/Time: _____ Observer Initials: _____Primary/Rely (circle one)

In the top row of the table specify the initials of no more than 4 consumers who are present during your observation. If a setting has >4 consumers, select 4 consumers with whom the observation will be done. For each 5-minute interval, tally the number of positive interactions the staff you're observing provides to each consumer. Consumers must be present for at least half of the interval (mark an "X" through the box if they exit or enter the setting during the interval). Note that a positive interaction requires the staff to show a pleasant facial expression (smiling, nodding) while emitting the behaviors listed below.

Time Sample	Consumer Initials:	Consumer Initials:	Consumer Initials:	Consumer Initials:
0:01-5:00	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise
5:01-10:00	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise
10:01-15:00	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise	_____ Give compliment _____ Converse with consumer _____ Greet consumer _____ Approp. physical interaction _____ Expression of care _____ Praise
Total # Positive Interactions				
Comments:				

Examples of positive interactions:

Give compliment: "You look nice today!"
Greet consumer: "Hi! Great to see you!"
Provide expressions of care: "It looks like you are sad – is everything ok?"
Converse with consumer: Talk about preferred topics, fun things to do
Provide appropriate physical interaction: High fives, pats on the back
Deliver praise for appropriate behavior: "Excellent job [specify behavior]!"

On-The-Job Feedback Protocol

The table below provides instruction for how to deliver feedback to staff after you complete your observation. Mark each step once complete.

Step	Implementation Guidelines	Complete?
Meet with the staff person immediately after the observation is complete (or as soon as you can).	Try to find a private or quiet location (consumers may need to be within eyesight, which is okay).	❑ Yes ❑ No ❑ NA
Review each behavior/time sample on the competency checklist.	Show the completed competency checklist to the staff.	❑ Yes ❑ No ❑ NA
Provide praise for staff's positive interactions with consumers (across consumers and time samples).	Use behavior-specific praise. Be authentic and sincere.	❑ Yes ❑ No ❑ NA
Provide corrective feedback about lost opportunities to interact positively or behaviors requiring improvement. *Note* remind staff to use *descriptive* praise if he or she provided generic praise during the observation.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"I noticed you didn't interact with Steve in the last 5-minute interval and he sat by himself at the table in the corner without a meaningful activity."*	❑ Yes ❑ No ❑ NA
Describe how the staff can improve interactions in the future.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"This was a perfect opportunity to mention the new movies coming out this weekend and ask if he'd like to look at Fandago. That way he could pick which movie he wants to see."*	❑ Yes ❑ No ❑ NA
Model correct implementation.	Modeling may occur with consumers or in a separate location. *"Let me show you how to engage Steve in this way."*	❑ Yes ❑ No ❑ NA
Rehearse correct implementation.	Ask staff to rehearse the steps you modeled; provide corrective and positive feedback.	❑ Yes ❑ No ❑ NA
Solicit questions and clarify any ambiguities.		❑ Yes ❑ No ❑ NA

Appendix B

Effective Instructions Competency Checklist

Home: _____ Staff: _____ Date/Time: _____ Observer Initials: _____
Phase: _____ Primary/Reli (circle one)

In the first column, write a brief statement summarizing every *new* instruction. A new instruction specifies a different behavior/task. Rephrasing an instruction that contains the same behavior/task is not considered new. For every instruction, score a + for #1 and #2 if they occur throughout the entire instructional sequence. For example, if staff instruct a consumer to sit down for a 2-min period, then that entire instructional sequence would only be scored + if every time staff instruct the consumer to sit down in that instructional sequence meets #1 and #2. For #3 below, score a + if staff prompt when consumers do not comply with a new instruction.

1. Pleasant tone and facial expression.
2. Phrased as a DO request (e.g., "Use your fork," "Put the dish in the dishwasher," "Brush your teeth.").
3. Includes tell (verbal)/prompt (model, gestures, or physical) instruction (i.e., at some point in the instruction, if the consumer does not comply, the staff should show, gesture, or physically assist the consumer to engage in the response). It is ok if the staff show or physically assist during the first instruction. Do not score as a tell/prompt instruction if the staff if the staff delivers verbal instruction, the consumer does not comply, and the staff moves to new instruction without providing a show or physical prompt.

Instruction Provided (Brief)	Pleasant Tone & Facial Expression		Phrased as DO Request		Tell/Prompt Instruction	
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-
	+	-	+	-	+	-

On-The-Job Feedback Protocol

The table below provides instruction for how to deliver feedback to staff after you complete your observation. Mark each step once complete.

Step	Implementation Guidelines	Complete?
Meet with the staff person immediately after the observation is complete (or as soon as you can).	Try to find a private or quiet location (consumers may need to be within eyesight, which is okay).	❑ Yes ❑ No ❑ NA
Review each instruction and its components for every instruction on the effective instructions checklist.	Show the completed effective instructions checklist to the staff.	❑ Yes ❑ No ❑ NA
Provide praise for intervals in which you recorded the delivery of effective instructions.	Use behavior-specific praise. Be authentic and sincere.	❑ Yes ❑ No ❑ NA
Provide corrective feedback about incorrect instruction delivery.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"I noticed you kept repeating the same instruction without prompting compliance."*	❑ Yes ❑ No ❑ NA
Describe how the staff can improve instruction delivery in the future.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"Be sure your instructions include do requests."*	❑ Yes ❑ No ❑ NA
Model correct implementation.	Modeling may occur with consumers or in a separate location. *"A way to deliver the instruction you gave, but in a clear way is to _____."*	❑ Yes ❑ No ❑ NA
Rehearse correct implementation.	Ask staff to rehearse the steps you modeled (or come up with another example); provide corrective and positive feedback.	❑ Yes ❑ No ❑ NA
Solicit questions and clarify any ambiguities.		❑ Yes ❑ No ❑ NA

Appendix C

Responding to Problem Behavior Competency Checklist

Home: _____ Staff Observed: _____ Date/Time: _____ Observer Initials: _____
Phase: _____ Primary/Reli (circle one)

In the top row of the table specify the initials of no more than 4 consumers who are present during your observation. If a setting has >4 consumers, select 4 consumers with whom the observation will be done. For each 3-minute interval, indicate the observed staff's response to minor disruptive behavior (MDB) or severe problem behavior (PB), or its absence. If the consumer is present during any part of an interval, collect data for that interval.

Use the following data collection codes:

- NA: not applicable; no occurrence of MDB or severe PB (rows 1 & 2) OR no opportunity to deliver a high-quality interaction (e.g., if engage in PB through entire interval (row 3)
- Y: staff responded correctly to MDB or severe PB (rows 1 & 2) OR staff delivered a high-quality interaction in absence of severe PB (i.e., at least 10 s passed w/o PB) (row 3)
    - To score Y, the staff must perform the correct response for each opportunity during an interval
- N: staff did not respond correctly to MDB or severe PB (rows 1 & 2) OR staff did not deliver a high-quality interaction in absence of severe PB (i.e., at least 10 s passed w/o PB (row 3)

Intervals	Scored Response	Consumer Initials:			Consumer Initials:			Consumer Initials:			Consumer Initials:		
0:01-3:00	Correct response to MDB (IVB or other non-harmful bx)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	Correct response to severe PB (PA, PD, SIB, ISB)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	High-quality interaction in absence of severe PB	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
3:01-6:00	Correct response to MDB (IVB or other non-harmful bx)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	Correct response to severe PB (PA, PD, SIB, ISB)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	High-quality interaction in absence of severe PB	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
6:01-9:00	Correct response to MDB (IVB or other non-harmful bx)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	Correct response to severe PB (PA, PD, SIB, ISB)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	High-quality interaction in absence of severe PB	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
9:01-12:00	Correct response to MDB (IVB or other non-harmful bx)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	Correct response to severe PB (PA, PD, SIB, ISB)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	High-quality interaction in absence of severe PB	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
12:01-15:00	Correct response to MDB (IVB or other non-harmful bx)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	Correct response to severe PB (PA, PD, SIB, ISB)	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N
	High-quality interaction in absence of severe PB	NA	Y	N	NA	Y	N	NA	Y	N	NA	Y	N

Definitions for correct staff responses and consumer behavior are on the reverse of this page

Responding to Problem Behavior Competency Checklist

Correct Staff Responses

- Minor Disruptive Behavior (MDB)
  - Staff should not comment ON minor disruptive behavior at any time. Thus, if staff comment on MDB in any interval, N should be scored for correct response to MDB for that interval (even if the MDB occurred in a previous interval). It is ok for staff to provide a choice for something to do, redirect to the ongoing or other activity, continue with a demand, etc. *Staff should not talk to consumers about their minor disruptive behavior, lecture consumers on what they are doing wrong or why it is wrong or annoying, etc*
- Severe Problem Behavior (PB)
  - Staff should not comment on the PB at any time and should not say anything to consumers until they have not engaged in PB for at least 10 s (and the comments should not be about PB). Thus, if staff comment on PB in any interval, N should be scored for correct response to PB for that interval (even if PB occurred in a previous interval).
  - Staff should not provide items or activities following problem behavior until at least 10 s without PB
  - Staff may need to intervene for safety when PB occurs, but when they do so, it should be while providing the least amount of attention as possible (no eye contact, not saying anything, etc.)
- High-Quality Interaction
  - Positive interaction (conversation, appropriate physical interaction) in absence of PB (at least 10 s without PB)

Definitions of Consumer Behavior

- Minor Disruptive Behavior (MDB)
  - Inappropriate Verbal Behavior (IVB): any vocal behavior that is offensive or disruptive to others (e.g., tease, yell, scream, use profanity, threaten, name-call, provoke others, argue or complain, cry, interrupt)
  - Other Non-Harmful Behavior: any instance or attempt to disrupt the physical environment that cannot harm self, others, or property (e.g., slam door).
- Severe PB
  - Physical Aggression (PA): Any instance or attempt of forceful contact (e.g., grab, hit, kick, bite, pinch, scratch, pull hair, or strike with an object) between any part of the consumer's body and the body of another person that could result in visible bodily damage (e.g., bleed, bruise, swell, redness)
  - Property Destruction (PD): Any instance or attempt of destruction of property (e.g., throw, rip/tear, knock over, hit, kick objects, burn, mark, scratch)
  - Self-Injurious (SIB): Any attempt, successful or not, at self-inflicted forceful contact (e.g., bite self; hit head against hard objects; self-scratch, cut or puncture; bite or rub skin; pull out hair, pick skin or remove scabs; chew nails into the quick; pinch self) with the consumer's body that could result in bodily damage (e.g., bruise, bleed, swell, redness)
  - Inappropriate Sexual Behavior (ISB): sexually explicit acts (or attempted acts) done in public places (e.g., touch/expose one's genitals in public, touch/expose another's genitals, sexually explicit gestures or remarks, engage in sexual acts with an unwilling person)

On-the-Job Feedback Protocol

The table below provides instruction for how to deliver feedback to staff after you complete your observation. Mark each step once complete.

Step	Implementation Guidelines	Complete?
Meet with the staff person immediately after the observation is complete (or as soon as you can).	Try to find a private or quiet location (consumers may need to be within eyesight, which is okay).	❑ Yes ❑ No ❑ NA
Review each behavior/time sample on the competency checklist.	Show the completed competency checklist to the staff.	❑ Yes ❑ No ❑ NA
Provide praise for staff's correct responses to MDB or severe PB (or their absence). Be sure to provide praise for responses that occur across consumers and time samples.	Use behavior-specific praise. Be authentic and sincere.	❑ Yes ❑ No ❑ NA
Provide corrective feedback about incorrect implementation of procedures following MDB or severe PB, or lost opportunities to deliver high-quality interactions. *Note* remind staff to use *descriptive* praise if he or she provided generic praise during the observation.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"I noticed you commented on Steve's disruptive behavior by pointing out why his reaction was annoying."*	❑ Yes ❑ No ❑ NA
Describe how the staff can improve interactions in the future.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"Next time avoid these types of comments. It is okay to redirect to another activity, but don't comment on the disruptive behavior."*	❑ Yes ❑ No ❑ NA
Model correct implementation.	Modeling may occur with consumers or in a separate location. *"Let me show you how to do this."*	❑ Yes ❑ No ❑ NA
Rehearse correct implementation.	Ask staff to rehearse the steps you modeled; provide corrective and positive feedback.	❑ Yes ❑ No ❑ NA
Solicit questions and clarify any ambiguities.		❑ Yes ❑ No ❑ NA

Appendix D

Consumer Engagement Competency Checklist

Home: _____ Staff Present: _____ Date/Time: _____ Observer Initials: _____
Phase: _____ Primary/Reli (circle one)

In the top row of the table specify the initials of no more than 4 consumers who are present during your observation. If a setting has >4 consumers, select 4 consumers with whom the observation will be done. Consumers must be present for at least half of the interval (mark an "X" through the box if they exit for more than half of the interval). This observation should be conducted during consumers' leisure or free time, not during structured activities.

Score a + if any of the following responses occur at any point during each 3-minute interval:

1. Positive interaction for engagement: Staff provide positive comment to individual regarding appropriate engagement.
2. Prompting with a choice: A staff physically presents and/or vocally offers at least two activity options. Example: "Would you like to do X or Y?", "Which one of these would you like to do?" Non-example: "What activity do you want to do next?"
3. Activity engagement: Consumer attends to/looks at an activity/item (e.g., watching TV, looking at a book or magazine, swinging) or manipulates an object/material in the way it is intended.

Time Sample	Scored Response	Consumer Initials:		Consumer Initials:		Consumer Initials:		Consumer Initials:	
0:01-3:00	+ intx for engagement	+	-	+	-	+	-	+	-
	Prompting with a choice	+	-	+	-	+	-	+	-
	Activity engagement	+	-	+	-	+	-	+	-
3:01-6:00	+ intx for engagement	+	-	+	-	+	-	+	-
	Prompting with a choice	+	-	+	-	+	-	+	-
	Activity engagement	+	-	+	-	+	-	+	-
6:01-9:00	+ intx for engagement	+	-	+	-	+	-	+	-
	Prompting with a choice	+	-	+	-	+	-	+	-
	Activity engagement	+	-	+	-	+	-	+	-
9:01-12:00	+ intx for engagement	+	-	+	-	+	-	+	-
	Prompting with a choice	+	-	+	-	+	-	+	-
	Activity engagement	+	-	+	-	+	-	+	-
12:01-15:00	+ intx for engagement	+	-	+	-	+	-	+	-
	Prompting with a choice	+	-	+	-	+	-	+	-
	Activity engagement	+	-	+	-	+	-	+	-

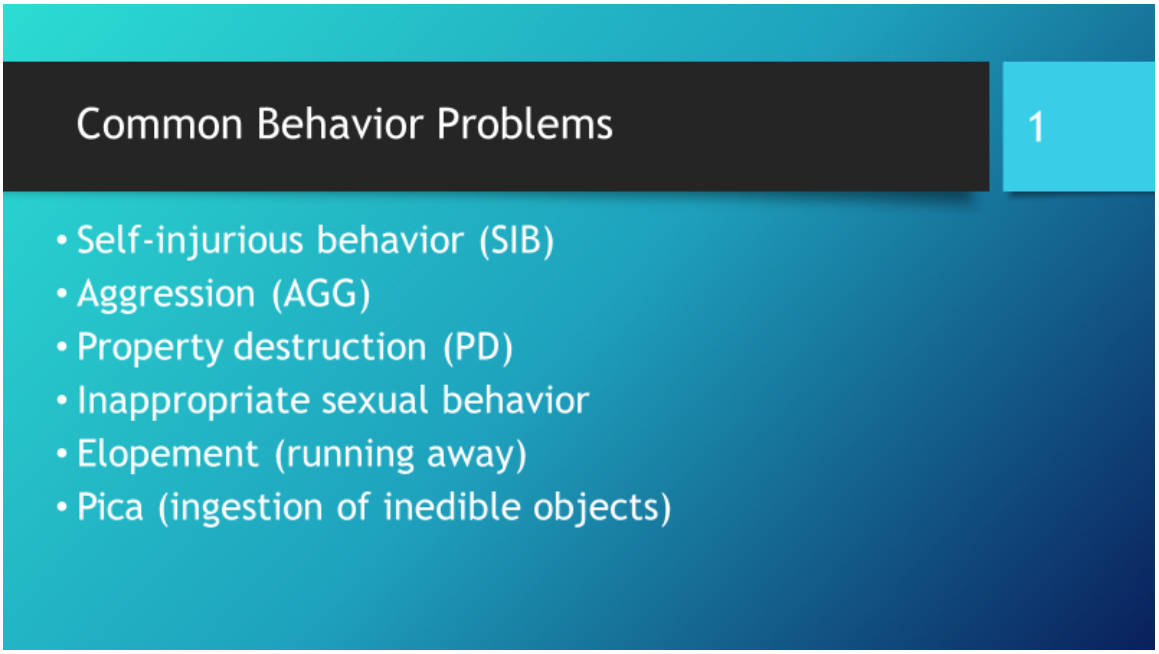
On-The-Job Feedback Protocol

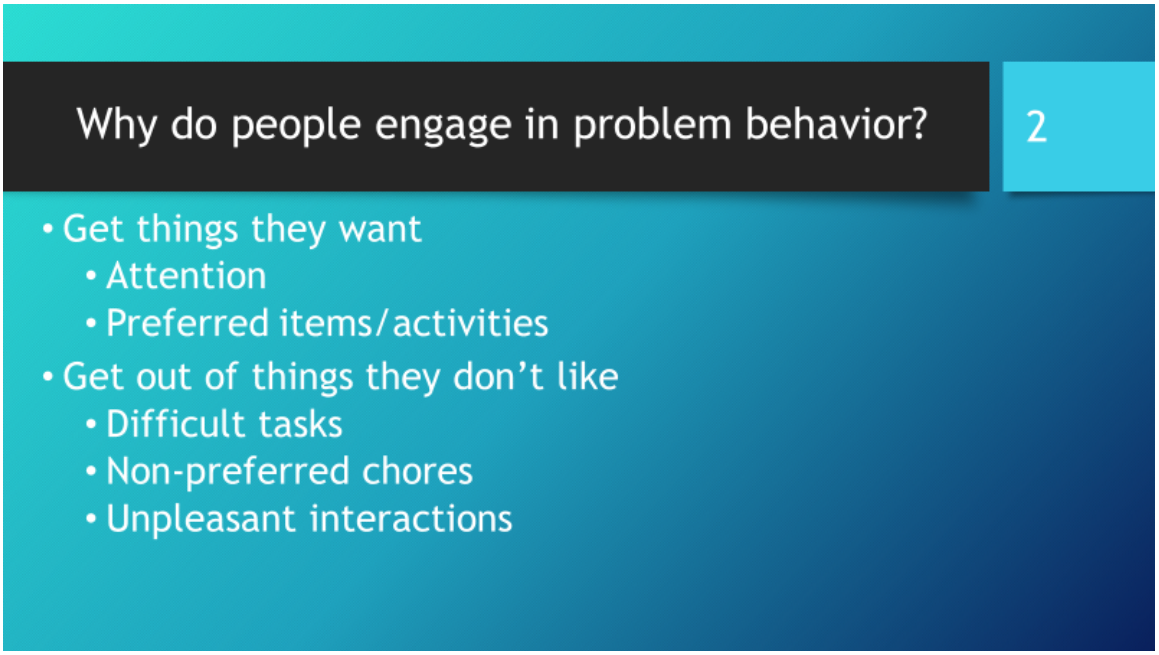
The table below provides instruction for how to deliver feedback to staff after you complete your observation. Mark each step once complete.

Step	Implementation Guidelines	Complete?
Meet each staff person involved in the observation immediately after the observation is complete (or as soon as you can). Data are not separated by staff, so it is likely staff will receive similar feedback.	Try to find a private or quiet location (consumers may need to be within eyesight, which is okay).	❑ Yes ❑ No ❑ NA
Review each behavior/time sample on the activity engagement checklist.	Show the completed activity engagement checklist to the staff.	❑ Yes ❑ No ❑ NA
Provide praise for intervals in which you recorded the occurrence of positive interaction for engagement, prompting with a choice, or activity engagement.	Use behavior-specific praise. Be authentic and sincere.	❑ Yes ❑ No ❑ NA
Provide corrective feedback about lost opportunities for engagement or behaviors requiring improvement.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"I noticed Steve had access to a preferred movie, but instead of watching it he tapped the DVD case on his knee repeatedly for 10 minutes."*	❑ Yes ❑ No ❑ NA
Describe how the staff can improve interactions and engagement in the future.	Corrective feedback can be respectfully delivered. Use a supportive tone of voice. *"This was a perfect opportunity to remind Steve to start the DVD and then praise him for watching it while sitting appropriately."*	❑ Yes ❑ No ❑ NA
Model correct implementation.	Modeling may occur with consumers or in a separate location. *"Let me show you how to engage Steve in this way."*	❑ Yes ❑ No ❑ NA
Rehearse correct implementation.	Ask staff to rehearse the steps you modeled; provide corrective and positive feedback.	❑ Yes ❑ No ❑ NA
Solicit questions and clarify any ambiguities.		❑ Yes ❑ No ❑ NA

Appendix E

Healthy Behavioral Practices Training PowerPoint





Healthy behavioral practices

3

1. Provide positive interactions
2. Provide access to preferred items and activities
3. Provide effective instructions
4. Engage in good practices following problem behavior

1. Provide positive interactions

4

1a. General positive interactions throughout day
1b. Descriptive praise for appropriate behavior

1a. General positive interactions

5

- What to do?
  - Eye contact and pleasant facial expression
  - Compliments
  - Greetings
  - Conversation
  - Appropriate physical interaction
  - Expressions of care

1a. General positive interactions

6

- When to do it?
  - As much as possible!
  - At least once every 5 min per consumer (DRIVE BY!)

1a. General positive interactions

7

- Why do it?
  - To promote healthy relationships
  - To decrease problem behavior
  - To increase appropriate behavior

1a. General positive interactions

8

Drive by while working

Conversation

1b. Descriptive praise

9

- What to do?
  - Positive comment or statement of thanks with description of what consumer did
    - *"Excellent job putting on your shirt!"*
    - *"Thanks for setting the table. That is super helpful!"*

1b. Descriptive praise

10

- When to do it?
  - When consumer does something you want to see again
  - Approximations to correct/appropriate behavior
  - Absence of problem behavior

1b. Descriptive praise

11

- Why do it?
  - Increase those appropriate behaviors in the future

2. Provide access to preferred items/activities

12

- What to do?
  - Provide consumer with choice of things to do
  - Provide consumers access to things they like to do

2. Provide access to preferred items/activities

13

- When to do it?
  - Throughout the day (whenever possible)
  - Down time
  - When staff busy doing other things

2. Provide access to preferred items/activities

14

- Why do it?
  - To promote healthy relationships
  - To decrease problem behavior

3. Provide effective instructions

15

- What to do?
  - Pleasant voice tone and facial expression
  - Simple and clear commands (break tasks into smaller steps)
  - DO rather than DON'T requests
  - Two-step prompting
    - TELL them what to do
    - SHOW them what to do (model or gesture to help)
  - Provide help if needed

3. Provide effective instructions

16

- When to do it?
  - During any instructional, task, or chore context

3. Provide effective instructions

17

- Why do it?
  - Decrease difficulty of task
  - Increase compliance and decrease problem behavior during instruction, task, or chore context

3. Provide effective instructions

18

Effective Instructions w/Compliance

Effective Instructions w/prompt or help

4. Good practices following problem behavior

19

- Ignore minor disruptive behavior (inappropriate verbal behavior and behavior that not harm self, others, property)
  - DO NOT comment on the behavior at any time

4. Good practices following problem behavior

20

- Instances or attempts of problem behavior (physical aggression, self-injury, property destruction)
  - Do not comment on the problem behavior at any time
  - Do not provide attention until problem behavior has not occurred for at least 10 s
    - If you must provide attention (e.g., physical intervention) for safety, then do so with least amount of attention possible (no eye contact, no talking to the consumer)
  - Do not present preferred items/activities until problem behavior has not occurred for at least 10 s