Evidence-Based Practices in Behavioral Health
Series Editor: Nirbhay N. Singh

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Behavior Safety and Clinical Practice in Intellectual and Developmental Disabilities

Springer

Evidence-Based Practices in Behavioral Health

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This book series brings leading researchers and clinicians together to collaborate on books that present current research-based evidence for specific treatments across a broad range of subject areas. These books not only identify evidence-based practices, but also practice-based evidence. Furthermore, each book identifies the gaps in knowledge for future research. This series presents state-of-the-art knowledge in behavioral health, including but not limited to such disciplines as psychology, psychiatry, clinical social work, nursing, and rehabilitation therapies.

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Behavior Safety and Clinical Practice in Intellectual and Developmental Disabilities

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Preface

Safety concerns are a priority among persons with intellectual and developmental disabilities (IDD) who may be susceptible to accidents and injuries, lack self-preservation skills that avoid hazardous exposure, and demonstrate harmful behavior such as self-abuse, aggression, and property destruction. Care providers also must be aware of personal safety when intervening physically with service recipients in crisis situations and on the basis of treatment plans. Within program settings, safety precautions extend to environmental care, staff training, and mitigation of workplace risk factors.

Behavior Safety and Clinical Practice in Intellectual and Developmental Disabilities is intended for multidisciplinary professionals who provide services to children, youth, and adults, are responsible for creating risk-averse therapeutic environments, and specialize with individuals who have learning, behavior, and health challenges. This primary audience includes psychologists, educators, behavior analysts, rehabilitation specialists, program directors, and safety consultants. The book also should appeal to researchers, trainees, and graduate students in the areas of clinical psychology, public health, special education, applied behavior analysis, and organizational behavior management.

For this book, we selected chapter authors of notable expertise as scientist-practitioners. Part I is devoted to assessment practices, including chapters on measurement of safety indicators, performance diagnostics, functional analysis, and social validity. In Part II, chapters cover intervention practices targeting challenging behavior, protective equipment, physical restraint, self-protection skills, and emergency responses. Part III on organizational practices features chapters in the areas of behavior-based safety, environmental design, health promotion, and care provider training. All of the chapters detail the evidence support for service recommendations and suggest future research directions.

We are grateful to Springer for publishing the book and to the authors who contributed to it. Our hope is that by assembling these contemporary topics, offering

practical guidance, and proposing new subjects of inquiry, the book will advance behavior safety in the delivery of clinical services to persons with IDD by practitioners, care providers, and other valued stakeholders.

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Assessment Practices

Chapter 1
Assessment and Measurement of Safety Indicators in Clinical Settings

Nicole Gravina, Lindsay Lloveras, Kerri Peters, and Davis Simmons

Assessment and Measurement of Safety Indicators in Clinical Settings

The Bureau of Labor Statistics reported that in 2021, healthcare workers sustained higher injury rates than workers in almost any other industry (bls.gov, 2022). Common employee injuries in healthcare settings include overexertion, strain from lifting, and injuries from client[1] aggression. In healthcare settings, there is not only risk for employee injury but also client injury (Evans et al., 2003). Client injuries can occur during challenging behavior (e.g., tissue damage due to self-injury; Iwata et al., 1990) and client transfers (e.g., bruising as a result of inappropriate hand placement during procedures) and because of hazards such as choking as a result of pica. The risk of injury for all individuals may be more likely depending on contributing organizational factors. A study by Warren Ralston and Brown (2023) found that 13% of behavior technicians surveyed reported no initial training on managing challenging behavior, 29% reported no ongoing training, and 75% reported sustaining an injury due to challenging behavior. Furthermore, 36% reported that their client's challenging behavior caused an injury. These preliminary results are con-

[1] We recognize that there are many names for individuals receiving behavior-analytic services (e.g., patient, client, consumer). Throughout this chapter, we will use "client" to refer to recipients of these services.

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cerning, but the data are self-reported, and research on safety and injuries in clinical settings that serve clients with intellectual and developmental disabilities (IDD) is still emerging.

Injuries create substantial direct and indirect costs for organizations, employees, and clients. Examples of direct costs for organizations include medical treatment, workman's compensation, costs associated with training and retraining, and lost billing and wages. Indirect costs for organizations include increased insurance premiums, legal fees, penalties, the replacement of damaged equipment, and damaged reputation among clients and employees. Indirect costs for employees include lost wages, unemployment, and costs associated with paying for someone to assist with household tasks. Clients can sustain indirect costs as well, including lost instructional time, the establishment of avoidance responding on the part of the client, staff avoidance responding in the form of skipping instructional content to avoid evoking aggression, and a need for increased medical intervention and other supports. When staff have sustained injuries from a client's challenging behavior, they might be more likely to use restraint or aversive contingencies when early indicators of aggression occur rather than following the least restrictive and best practices for managing aggression (Sloman et al., 2005). Although these are significant issues, limited safety research focuses exclusively on clinical settings that serve individuals with IDD. To better understand employee and client injuries in human service settings, systems for measurement and assessment must be established. Thus, the purpose of this chapter is to describe relevant measurement and data analysis procedures that can be adopted in clinical settings. These data can lay the foundation for improved assessment and development of interventions to reduce injuries.

Data Sources

One unique challenge in IDD service delivery is that the settings vary widely, and the clinical environments have a direct impact on the resources available to measure and assess safety. For example, hospital and center-based programs are more likely to have resources to capture safety concerns, such as standardized documentation requirements, video-recording equipment, and staff available for data collection. Home and community-based services might not include those resources. Thus, organizations planning to add or modify safety measures will have to design both data collection and intervention procedures that fit their setting. Because of the time and resources required to create data collection systems, established programs are more likely to already have systems in place compared to new programs. Many times, organizations begin with a simple or already existing data collection system and enhance the system over time to capture more meaningful information. Organizations might be subject to state and federal laws requiring measuring and reporting some aspects of workplace safety. Therefore, when developing or refining data collection systems in an organization, leadership should check regulations to make sure their systems are in compliance (e.g., joint commission, specific payer

requirements). Overall, gathering high-quality safety data is imperative for designing and evaluating effective safety programs.

There are several potential meaningful sources of data that can be used to measure and assess safety in clinical settings. Mature safety programs use several sources of data to understand risk and determine opportunities for intervention. Ideally, safety data include a mix of "lagging" and "leading" indicators. Lagging measures are information gathered after a safety event has occurred, such as an incident report. These data provide information about the impact of incidents on the organization, and a postmortem analysis can lead to solutions that prevent similar incidents in the future. Leading measures, on the other hand, provide information about the risk for injury before an incident occurs and can include measures of behavior, procedural adherence, and working conditions (Bayramova et al., 2023). Leading measures enable organizations to prevent injuries by identifying and reducing risk before an injury has occurred (Almost et al., 2018). Next, we outline several potential sources of data in the context of developing a sustainable measurement system and how they can be used to assess safety and develop effective interventions.

Common Data Sources Applied to Human Service Provision

Incident Reports

Following an incident, most organizations document the situation that led to the incident and the injury sustained. The Occupational Safety and Health Administration (OSHA) recommends documenting any case that includes an injury or a close call, that is, when an injury could have occurred but did not. Close calls are documented because they can provide additional information about safety risk and trends. In practice, serious incidents are rare, but often, several close calls occur that lead up to the incident. OSHA suggests documenting the location, the work activity being completed during the incident, the steps leading to the incident, the location and severity of the injury, whether safety protocols were in place and followed, whether there were witnesses, and follow-up actions. OSHA (n.d.-a) provides a template for documenting injuries. In addition to the content OSHA suggests, organizations should also include a section to document antecedents, behaviors, and consequences (ABCs) for the incident. The ABCs should be tracked not only for the injured employee but also for the supervisor, manager, and others involved in the incident. Identifying the ABCs across different levels of an organization can facilitate assessment and intervention development to systematically address the causes of injuries resulting from relevant interlocking behavioral contingencies (IBCs; Gravina et al., 2017; Ludwig, 2017). Table 1.1 provides an example of an ABC description of an incident.

Incident reports can be used to assess safety practices and design interventions in three ways. First, the information gathered from the assessment (i.e., OSHA

Table 1.1 Incident: staff member sustained bite injury from client

	Antecedent	Behavior	Consequence
Staff member behavior	Staff member was not wearing arm guards.	Staff member reached in front of client during instructional activity.	Staff member sustained bite injury.
Client behavior	Staff member delivered instructional activity to client sitting at desk.	Client bit staff member on the arm.	Staff member provided escape from instructional activity.
Supervisor behavior	Time constraints were put in place surrounding nonbillable activity.	Crisis management training was out of date for staff members.	Staff sustained injury.

reporting standards, root cause, and ABC analyses, among others) can help identify contributing factors that could lead to future incidents (McSween & Moran, 2017). For example, following a root cause analysis that identifies a training deficit as one of the contributing factors to an incident, an organization might change the policy for crisis management refresher training or choose a different crisis management training altogether. Second, the incident report can be looked at in the aggregate across time. Typically, injury data are graphed by month or year to assess overall safety trends. Note that some organizations see an uptick in injury reports when more focus is placed on injury prevention because employees begin to document incidents they might not have recorded previously. Thus, it can also be beneficial to graph severity in addition to frequency over time. If an increase in documented incidents occurs following an increased focus on safety but severity stays the same or decreases, incidents were likely previously underreported. The increased reporting will provide the organization with more information that can be used to improve safety long-term.

Third, incident reports can be used to assess and identify trends that can aid in intervention identification. For example, reports can be categorized by time of day, day of the week, type of task, type of injury, injury location on the body, work setting location, employees (individuals, job titles), clients (individuals, age, common concerns), hours worked, and more. These data can be used to identify trends that can result in more targeted interventions, such as increasing staffing during risk times, requiring a supervisor to be present during evocative instructional activity, or ensuring that protective equipment is available in particular locations. Data gathered can also inform measurement procedures, which will be discussed later.

Hazard Measures

According to OSHA (n.d.-b), hazards are environmental conditions that increase the risk of injury or illness. These can include biological hazards like bodily fluids and illnesses, ergonomic hazards like awkward position and lifting, chemical hazards like cleaning agents, safety hazards like tripping hazards or spills, physical hazards like extreme temperature or noise, and work organization hazards like stress, high

Table 1.2 Examples of the different types of hazards in clinical settings

Hazard	Clinical examples
Biological	Saliva as a result of expulsion, blood after an injury, feces during fecal smearing, urine during diaper changes
Ergonomic	Client lifting, client restraint, supporting client during flopping, sitting in child-size chairs
Chemical	Cleaning agents
Safety environment	Choke hazards on the floor, outlets uncovered, items not secured down during times of challenging behavior
Physical	Extreme noise, fatigue, lack of fire safety plan, client aggression
Work organization	Stress from long hours of client contact, lack of supervision and training for challenging behavior

demands, and aggression. Common hazards in clinical settings or schools that serve individuals with IDD might include choking hazards, hazardous (cleaning) chemicals, loose equipment and materials that could be harmful during an aggressive incident, doors and gates that do not lock properly, trip hazards, and allergens. See Table 1.2 for more examples of hazards in IDD clinical settings. Hazards that might be present during daily operations should be considered, along with potential emergency hazards like weather-related events, fire, or an active shooter.

Organizations that serve individuals with IDD should develop a comprehensive hazard checklist that is completed monthly and an abbreviated checklist to be used daily or by the client. The comprehensive checklist could make note of potential hazards, such as structural issues like working doors and window locks, functioning and available protective equipment, bathroom facilities in good working order, refrigeration temperatures, working cameras, cleaning supplies available and stored correctly, fire extinguishers not available, and so on. Hazards identified might require hiring maintenance services to address the concerns. Because these issues can take time to attend to, some organizations post a list of hazards identified and planned maintenance to increase employee awareness that there is a concern and it will be addressed.

A daily or client-specific checklist should be used to examine the current environment where services are provided for immediate risk before sessions begin, like choking hazards, outlet covers, and trip hazards on the floor (e.g., Grauerholz-Fisher et al., 2019). Upon the completion of this pretask risk assessment tool, the staff should review the checklist and address the concerns. A daily or client-specific checklist is a leading measure that promotes the proactive identification and elimination of emerging hazards in a constantly changing environment (Agnew, 2016). For example, researchers designed a hazard recognition checklist observation tool customized for an operation room and used it before each surgery (Simon et al., 2016). Following implementation, there was a 68% reduction in days away from work due to injury in one operation suite, and the program was expanded to other areas of the hospital. A similar approach could be used in human services.

Of course, the organization will need to establish a system for encouraging checklist compliance. It is important to quickly address concerns identified by the checklists to eliminate current hazards and so that employees can see the immediate value of their implementation. Supervisors should track checklist use and provide positive feedback for completion and note concerns. Checklist review can be added to a monthly meeting agenda to remind employees to complete the checklist and report hazards, as well as provide follow-ups on previously identified issues. Hazard identification should be celebrated as progress toward safety, rather than admonishing employees because the hazards exist.

Safety Behavior and Conditions Checklists

Comprehensive safety programs typically include frequent measures of behavior and environmental conditions. Recall that these measures are considered leading indicators, meaning they can be used to predict and reduce the likelihood of injury in the future. Typically, the safety measurement tool, usually referred to as a safety checklist, is devised by examining 3–5 years of injury data, interviews, current procedures in place, and other information to identify critical behaviors and conditions. Checklists can include items that measure whether employees are wearing the appropriate protective equipment and following common safety procedures and if the environment is set up to avoid injuries (e.g., leaving materials out vs storing appropriately). The checklist also leaves space for notes that can help highlight and aid the resolution of concerns. Thus, if an observer finds that an employee is not wearing protective equipment but the employee shares that there was no equipment available, this can be noted so equipment shortage can be addressed.

Organizations that use safety observations can create an observation system where employees conduct short observations of their peers and the environmental conditions and provide feedback following the observation. The checklists do not include the names of the observed employees to avoid the potential of punishing consequences from leaders, and instead, the data are aggregated and assessed at the group level. Observation systems can be voluntary or mandatory, and observation completion can be measured and reinforced. Organizations can set goals for monthly participation and the number of observations completed. Limited research suggests that more engagement in safety observations might be associated with reduced injuries; however, more recent research suggests that having a smaller group of specialized observers who conduct more frequent high-quality safety observations may be more effective at reducing injuries (Spigener et al., 2022). Observation data can be used to identify common concerns that can be addressed with training, environmental changes, or other interventions. These data can also create the opportunity for leaders to provide feedback and positive consequences for engaging in safety-related activities. Data from these measures should be graphed regularly and shared with employees. Leaders should highlight successes and set goals to improve one or two aspects of safety performance.

Organizations might include separate safety checklists for other safety-related behavior, like attending and participating in safety meetings; discussing safety and safety data during regularly scheduled meetings; the number of safety concerns shared; the number of observations conducted; the number of safety concerns identified and addressed; the percentage of employees with up-to-date training, including crisis management; and hazard walk completion. These data provide information about employee engagement in safety and highlight actions employees and leaders can take to make safety an integral part of daily operations. Along with these objective measures of safety performance and participation, other measures that gather staff feedback can provide additional information to improve safety outcomes in clinical settings.

Staff Reports of Concerns

Employees can report safety concerns through maintenance work requests, anonymous reporting boxes and surveys, discussions with their supervisor, and other means. Sometimes they flag issues that might occur infrequently, and therefore do not appear in other data, but could be serious events. For example, the computer cart in a room might pose little risk most of the time, except with clients who occasionally exhibit challenging behavior by throwing items at staff. Often, staff can identify these risks and should have the opportunity to share their concerns and identify potential solutions.

In some circumstances, organizations can choose to implement anonymous reporting tools, which allows employees to report concerns that they might not share otherwise because they worry about retribution or negative impacts on social relationships. Some organizations use an online survey system, while others use paper-based reports. The reporting system should guide the employee to provide enough information that the report is actionable while not identifying them. When appropriate, supervisors should share the anonymous report with staff and describe solutions.

Supervisors can also include a standing agenda item to discuss safety in team meetings, and the staff can be encouraged to share concerns. It is vitally important that supervisors reinforce reporting by thanking the employee for sharing, asking questions, seeking out solutions, or sharing why a solution cannot be implemented at this time after looking into options. An absence of anonymous reports or reports in meetings suggests that people are not attending to safety or do not feel comfortable bringing up issues. Regular reports of concerns reflect a healthy safety culture. Taken together, leading measures like behavioral and hazard observations and lagging measures like incident reports and employee concerns are common data sources that can be used to inform safety practices; however, there are other unique data sources that may also be useful to consider in a clinical setting.

Data Sources Unique to Human Service Provision

Restraint and Seclusion Measures

As mentioned above, the nature of providing services to individuals with IDD and challenging behavior unfortunately may require the implementation of restraint and seclusion. Although the implementation of restraint or seclusion is designed to maintain safety and prevent injury, these procedures are not without their own safety risks (Vollmer et al., 2011). In circumstances where challenging behavior results in restraint or seclusion, data should be collected to assess both staff and client safety. In addition to what types of restraint or seclusion can be used in a particular setting, regulatory bodies often mandate some level of reporting for restraint and seclusion (e.g., joint commission, specific payer requirements, school board regulations), but practitioners may consider expanding their data collection system beyond what is reported to regulators.

It is important to document the type of restraint or seclusion used on an instance-by-instance basis. The data collected may be general, as a four-person supine hold, or training specific. By documenting restraint or seclusion type, the clinician can assess if a client's programming is becoming less or more restrictive over time. For example, the number of protective measures may not change over time, but the number of people required to implement them may decrease. This would be a lagging indicator of progress both in terms of risk and intervention effectiveness. Additional measures can include the frequency or duration of restraint or seclusion (Luiselli, 2009), and trends can be tracked longitudinally.

Further, clinicians can document who was involved in each protective measure. This allows the clinician to identify if some staff participate in more protective measures than others. Such an outcome may be an indicator of fatigue or burnout (Anderson et al., 2021) or could mean that a particular staff member is implementing programming differently from the rest of the team, and this difference is resulting in more dangerous behavior necessitating restraint or seclusion.

Clinicians can also track the behavior that resulted in restraint or seclusion. This measure may help supervisors identify if there is a true safety concern resulting in restraint (e.g., elopement into oncoming traffic, major aggression) or if restraint is being implemented inappropriately under noncrisis circumstances, resulting in unnecessary risks to staff and clients. Relatedly, one can collect data on strategies attempted to avoid restraint or seclusion prior to its implementation. This provides information about what other strategies were attempted before protective measure implementation and whether these strategies are ineffective or result in a higher safety risk, in illustration, if an iPad was given to a client to de-escalate a crisis but the iPad was then thrown at the staff. Any injury to staff or clients that occurred during restraint or seclusion should also be recorded. Injury data inform whether staff need to be retrained in crisis procedures or if procedural efficacy and safety should be further evaluated for a particular client.

There are also circumstances when psychotropic medications (so-called chemical restraints) or emergency treatment orders are administered to clients in medical settings (Currier et al., 2000). In addition to information regarding medication administration, such as name, dosage, route, and time, practitioners can consider also documenting the information above that we recommend for nonchemical restraint.

Mechanical restraint, another restrictive procedure, can be either administered as a preventive measure (e.g., arm splints in the prevention of hand-to-head self-injury, a gait belt to prevent elopement) or as needed (e.g., four-point wrist/ankle restraints). In addition to the recommendations for data collection for the other types of restraint mentioned above, there may be important information specific to mechanical restraint, such as circulation and movement, that can be documented as a leading measure of client safety. We recommend consulting with a medical professional to identify specific safety concerns and whenever mechanical restraint is applied to clients.

Bodily Indicators of Client Safety

Due to the nature of human service work, and in particular the provision of human service to clients with IDD, there are several personal bodily safety concerns that clinicians can measure and assess. One area is the objective measurement of the impact of challenging behavior. Clinicians can complete body check forms at the beginning and end of each day or after any episode of a challenging behavior or restraint/seclusion. This procedure can provide information about safety during clinical sessions and any potential abuse that might occur inside or outside of sessions. In relation to abuse, clinicians can measure challenging behavior in the restroom, when changing a client's clothes, or in the presence of particular stimuli, perhaps more challenging behavior with males or crying when alone in the room with a staff member. These are potential indicators that further investigation into the causes of challenging behavior may be warranted (Mandell et al., 2005). Clinicians can also assess if clients can name body parts or accurately recall past events and teach these skills as a preventive strategy for abuse.

Further, clinicians can measure the impact of self-injury to evaluate the effectiveness of interventions or the safety of procedures (Iwata et al., 1990). If self-injury continues to produce large injuries, clinicians could reevaluate the safety procedures in place and consider additional protective measures. A clinician may also want to measure where the injury is located on the body to see if the injury moves on the body with behavior or stays in the same place; this may provide information not only about safety but also about behavioral function (e.g., Thompson et al., 1994).

Additional measures that may relate to safety are objective indices of illness or pain (e.g., via pollen count, fevers). A clinician can later relate those data to other safety indicators. For example, it is an important safety consideration to evaluate if

challenging behavior or other health considerations, like seizures, are more frequent when a client experiences illness. Another example of medical safety measures is the type or amount of food consumed and voids passed (Bird et al., 2022) if there is a concern for food allergies or illness.

Supervision Measures

Supervision is integral to the provision of applied behavior analysis (ABA) services (CASP, 2020). Supervisors can use this time to collect and monitor hazard, close call, and behavior data as well as assess treatment integrity as poor integrity may contribute to higher safety risks. Supervision is also essential to prevent abuse. The mandatory reporting of concerns of abuse or neglect can be facilitated by good data collection and measurement systems. Supervisors should also continually monitor not only the data collected but also the measurement systems themselves to ensure that they are sensitive enough to capture any meaningful changes. Organizations should also monitor the rate of supervision provided across both clients and supervisees.

Caregiver Reports

Similar to supervision, caregiver training should be well integrated into behavior-analytic service provision (CASP, 2020). As such, providers have an opportunity to assess safety in multiple settings. Clinicians can evaluate the safe implementation of behavior-analytic protocols with the caregiver-client dyad and conduct home visits and assess hazards in the home.

Regular and informative communication among caregivers and with their supervisors is essential. They should report any new concerning behavior, health concerns that could result in increased safety risk such as migraine headaches increasing fall risk and sleep issues, medication changes, or any use of restrictive safety procedures outside of home.

Caregivers can also facilitate collaboration with the client's other providers (e.g., physical, occupational, and speech therapists), first, by collecting safety data that other providers can incorporate into service provision (e.g., time in ankle-foot orthoses without challenging behavior). Second, other providers can contribute measurement data that aid service provision, such as the texture of food that a client can consume safely. Although restraint and seclusion measures, bodily indicators of client safety, supervision measures, and caregiver reports are unique data sources that may provide useful information to reduce risk and injury in clinical settings, these metrics still require a sustainable measurement system to ensure improved safety outcomes over time.

Creating a Sustainable System

Maximizing the utility of these data sources requires a sustainable safety program to efficiently collect and analyze data, effectively communicate results, and promote sufficient action. The effective development and implementation of the system likely require leadership buy-in across organizational levels, including but not limited to (a) the allocation of sufficient resources (e.g., employee work time, funds for training, materials, and development); (b) the adoption or creation of supporting policies, operationalized procedures, work standards, and necessary safety materials (e.g., basic work expectations, observation checklists, standardized reporting and data collection templates); (c) onboarding and ongoing training programs; and (d) performance feedback programmed across all levels of an organization (Odom et al., 2019). One way to increase the sustainability of measurement systems is to create a safety committee or safety point person who regularly reviews data, suggests action steps based on the data, and provides feedback and reinforcement for engagement with the measurement system. Large organizations might create a safety professional job role that manages the safety committee, and small organizations might designate one person to dedicate some of their time to safety data collection and analysis. Ideally, participation data, injury and behavioral data, and the action steps completed would be frequently communicated to employees visually and verbally, minimally at monthly meetings.

Conclusion

In summary, there are many ways to measure and assess safety in settings that serve IDD populations. Safety is a critical component of any place of employment, and there are special considerations that should be made during ABA service delivery. Organizations specializing in ABA service provision should measure and assess safety using both universal organizational data sources and data sources unique to human service provision. As human service organizations continue to grow and expand the services provided, the measurement systems used should evolve to meet the needs of the organization an clients. Although the availability and feasibility of measures vary widely across settings, organizational leaders should include multiple sources of data to inform their assessment and intervention development. Measurement without analyzing data is a wasted effort, and thus leaders should arrange for a regular review of data and planned action steps based on findings. These data can lay the foundation for the improved assessment and development of interventions to promote safety for both the staff and the client.

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Chapter 2
Performance Diagnostic Assessment

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Applied behavior analysis (ABA) is the application of behavioral principles to socially significant behavior (Baer et al., 1968). ABA-based interventions generally consist of four components: assessment, treatment, generalization, and maintenance. ABA interventions have two general purposes: (1) to increase a skill or behavior that is not occurring enough (i.e., skill deficit) and (2) to decrease or eliminate a behavior that is occurring too much (i.e., behavioral excess). A variety of interventions have been developed to achieve these purposes. ABA includes a variety of subspecialties or areas of focus, including clinical ABA, in which most work is conducted with individuals with intellectual and developmental disabilities, sports and fitness, and education-related applications, among others (Cooper et al., 2020).

Assessment in ABA is designed to identify the environmental variables controlling behavior. Once identified, those environmental variables are manipulated to change behavior. For example, in clinical ABA, the assessment of behavioral excesses is routinely conducted to identify the sources of reinforcement maintaining the excess. The assessment procedure, termed functional assessment, can be useful to determine if the target behavior is maintained by social positive reinforcement, social negative reinforcement, automatic positive reinforcement, or automatic negative reinforcement. Based on assessment results, treatments that directly target the maintaining variable(s) are then implemented.

Organizational behavior management (OBM) is another subspecialty within ABA. OBM consists of the application of behavioral principles to improve the performance of individuals and processes within organizations (Wilder et al., 2009).

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Three subareas of OBM exist: performance management, behavioral safety, and behavioral system analysis. Performance management focuses on managing the performance of individuals or groups of employees. Behavioral safety focuses on increasing safe performance in organizations. Behavioral system analysis focuses on improving processes in organizations. The applications of OBM can be found in for-profit businesses, not-for-profit organizations, and government settings (Wilder et al., 2009).

Assessment in OBM, sometimes referred to as performance diagnostic assessment or simply performance analysis (PA), is designed to identify the environmental stimuli and events (or lack thereof) responsible for poor employee performance. Assessment in OBM includes historical methods, informant or indirect methods, descriptive methods, and experimental methods (Gravina et al., 2021). Historical methods of assessment consist of reviewing records of behavior or performance. Some of these records may be older, and some may be more recent. Informant or indirect methods consist of questionnaires or checklists, typically completed by the employee's supervisor. Descriptive methods of assessment consist of directly observing performance as it occurs and identifying the relevant variables that may be hindering performance. Experimental methods consist of manipulating antecedent and (sometimes) consequent events while measuring performance to identify the variables most pertinent to the performance.

Some of the variables responsible for problematic performance include inadequate training, poor equipment, insufficient processes, and inadequate consequences. After the assessment process is complete, interventions designed to address the areas identified as deficient are developed and implemented. In some cases, multiple variables may be influencing performance, so multiple intervention components are included.

By far, the most common method of PA is the informant or indirect method (Wilder et al., 2018a, b). The most commonly used type of informant or indirect tool is the performance diagnostic checklist (PDC; Austin, 2000; Gravina et al., 2021). The PDC is a questionnaire designed to identify barriers to adequate performance. It is typically completed via an interview with the supervisor of the employee exhibiting a performance problem. The tool consists of four domains or content areas, each with four to six questions. The domains are *antecedents and information*, *equipment and processes*, *knowledge and skills*, and *consequences*. The PDC was designed based on the behavior engineering model (Gilbert, 2007) and includes similar questions.

A number of studies have demonstrated the utility of the PDC. Pampino et al. (2004) used the PDC to identify barriers to the completion of maintenance tasks in a coffee shop. The results of the PDC suggested that a lack of appropriate consequences for task completion contributed to the performance problem. An intervention based on PDC results was effective in improving performance. As another example, Doll et al. (2007) used the PDC to assess the poor performance of maintenance tasks at a ski shop. The PDC identified a deficit in antecedents and information, as well as consequences. Task clarification and feedback were used to increase performance; the combination intervention was effective.

A more recent version of the PDC, the PDC-Safety, was developed to assess and improve safe performance. Cruz et al. (2019) applied the PDC-Safety to assess and improve handwashing and sanitizing by staff members at a clinic serving individuals with intellectual disabilities. The results of the PDC-Safety suggested that the lack of handwashing was due to a deficit in proper antecedents as well as information provided to employees. The researchers first evaluated a nonindicated intervention, which was ineffective. They then evaluated an indicated intervention, prompting, which was effective for two of three participants. The third participant required the addition of feedback to sustain performance.

Pugliese et al. (2021) used the PDC-Safety to evaluate the reasons for the lack of protective safety equipment use by staff members in a private school serving individuals with intellectual disabilities. Many of the students at the school exhibited severe behavior, such as aggression and self-injury, and the staff members often had to intervene to prevent injury, which required the use of protective equipment. The researchers used the PDC-Safety in each of the three classrooms. The results suggested that the staff in each classroom were not using protective safety equipment for different reasons. Three interventions, which included combinations of feedback, an incentive system, and task analyses, each tailored to a separate classroom, were evaluated. Each intervention was effective in increasing protective safety equipment use in the classroom in which it was used.

Performance Analysis in Human Service Settings

One of the most common settings in which PA has been used is the human service setting, which includes hospitals, clinics, schools, and group homes. Most of these settings serve individuals with intellectual and developmental disabilities. To make the PDC more compatible for use in these settings, Carr et al. (2013) created the Performance Diagnostic Checklist-Human Services (PDC-HS). The PDC-HS is divided into subdomains, with questions constructed to support the identification of variables contributing to performance deficits. The domains in the PDC-HS are similar to those in the PDC and include (1) *training*; (2) *task clarification and prompting*; (3) *resources, materials, and processes*; and (4) *performance consequences, effort, and competition*. Like the PDC, elevated scores within a domain typically indicate the likelihood that variables within that domain are those most likely to be associated with performance concerns. The PDC-HS is most often completed during an interview with the supervisors or managers within an organization, who in turn answer questions about the performance of specific employees exhibiting a performance problem. A direct observation of employee performance may also support the results gathered from the informant portion of the assessment. Much research has been conducted on the use of the PDC-HS, including studies that validate the tool. The validation of the PDC-HS involves comparing the effectiveness of interventions selected as a result of being related to domains indicated by the PDC-HS versus interventions not indicated by the

assessment. If the indicated interventions are more effective than the nonindicated interventions, the tool is said to be valid.

The initial study evaluating the PDC-HS was conducted with employees who provided center-based early intervention services to children aged 3–7 diagnosed with autism (Carr et al., 2013). Part of the employees' responsibilities involved maintaining the cleanliness of the various therapy rooms, thus a safety precaution to promote hygiene and prevent illness. However, the employees were performing below targeted performance standards. As such, researchers completed the PDC-HS with the participants' supervisors, who identified insufficient training and feedback as the primary variables contributing to performance issues with cleaning procedures. The researchers evaluated the effects of a PDC-HS-indicated intervention against interventions not indicated by the PDC-HS. These included training and graphed feedback (indicated interventions) and task clarification and equipment modification (nonindicated interventions). The results revealed that cleaning performance improved substantially from a baseline range of 18–47% of cleaning tasks correctly completed to a range of 80–100% as a result of the indicated intervention. By contrast, the nonindicated intervention either decreased performance below baseline levels or produced improvements up to 36% (Carr et al., 2013).

Another study evaluating the PDC-HS was completed shortly following its initial development. Working with employees at a special education school, the researchers investigated the effects of a treatment package based on PDC-HS results to address employee fidelity with implementing discrete trial training (DTT; Miller et al., 2014). Notably, rather than having the employees' supervisors complete the PDC-HS, the researchers interviewed other nonparticipant employees working in the same role as the participants. The results of the PDC-HS indicated variables contributing to performance concerns, such as issues with antecedents and information, consequences and feedback, and equipment and processes. In turn, the treatment package consisted of feedback, goal setting, and the use of incentives. Results showed that the treatment package was successful, with treatment fidelity improving from 43.7–72% to 75.5–94.1% (Miller et al., 2014).

Research investigating the effects of PDC-HS-indicated interventions on the performance of staff implementing DTT with clients was extended by Bowe and Sellers (2018), who worked with employees in a special education classroom. Specifically, the employees were exhibiting performance concerns related to DTT error correction procedures. The PDC-HS was completed with the employees' supervisors, and results suggested that the variable of most concern was training. To further validate the results of the PDC-HS-indicated intervention, a nonindicated intervention consisting of task clarification and prompting was compared against the effectiveness of behavioral skill training (BST), which is the intervention of choice when training has been deemed insufficient. Results demonstrated that the nonindicated intervention never resulted in performance improvement to mastery criteria. However, the indicated intervention was consistently associated with the mastery criteria being met by all the participants. The researchers also collected social validity measures, with results indicating that the participants found the interventions to be

satisfactory. The participants also noted that they would favor using the PDC-HS to address future performance issues (Bowe & Sellers, 2018).

The PDC-HS has also been used to address therapist performance with respect to natural environment training (NET) for communication skills. Wilder et al., (2018a) conducted a study in a clinic in which ABA therapists taught language skills to children diagnosed with autism. The researchers explored how a PDC-HS-indicated treatment package consisting of task clarification, behavioral skill training (BST), increased availability of materials, and graphic feedback impacted the rate of verbal operant practice opportunities seized by the participant therapists during client playground breaks. For this study, the PDC-HS was administered to the therapists' supervising Board Certified Behavior Analysts® (BCBA®s), with the indicated intervention results compared against the nonindicated interventions. The results demonstrated that the therapists' verbal operant practice rate increased from between 0 and 0.04 times per minute at baseline to a range of 0–0.13 per minute during the nonindicated intervention. However, during the indicated intervention, these rates substantially increased to a range of 0.68–1.02 per minute. It should be noted that these results were observed across the teaching of three verbal operants (tacts, mands, and listener responding skills). The researchers then ran a second experiment, with different participants evaluating whether interventions would also impact the use of a Motivaider™, which is a tactile prompting device, during DTT programs designed to improve client eye contact. The results of the PDC-HS for experiment 2 highlighted the domain of resources, materials, and processes as contributing to performance concerns with accurate program implementation. Following the indicated intervention, the participants improved their accuracy and their implementation of the program during every shift (Wilder et al., 2018a).

Russel et al. (2020) also evaluated the effects of PDC-HS-indicated interventions to address therapists' implementation of NET procedures; however, the purpose of these interventions was to improve client social skills. Working with employees at an ABA clinic servicing clients with autism, the researchers were interested in increasing staff interactions with clients as well as other staff members. The PDC-HS results revealed performance consequences, effort, and competition as the variables contributing to problematic employee performance, which was defined as interacting with clients and other staff on 80% or fewer opportunities. During baseline, participants interacted with clients between 36% and 52% of opportunities, while staff-to-staff interactions were observed to occur between 47% and 100% of opportunities. The first intervention, which consisted of visual prompts (rules), resulted in immediate increases in staff-to-client interactions and decreases in staff-to-staff interactions, but these results were short-lived, and performance returned to baseline levels shortly thereafter. Following a return to baseline condition in which performance remained similar to the initial baseline phase, a second intervention, consisting of group graphed feedback, also yielded mixed results, with highly variable staff-to-client interactions ranging from 31% to 75% of opportunities and staff-to-staff interactions ranging from 30% to 72%. A final return-to-baseline condition was then introduced in which interactions remained occurring at levels similar to previous conditions. The final intervention, consisting of individual feedback,

corresponded with mastery criteria being met for both staff-to-client interaction increases and staff-to-staff interaction decreases (Russell et al., 2020).

Additional research evaluating the effectiveness of assessment-based interventions has also been demonstrated with caregivers rather than employees. Melendez et al. (2020) focused on improving the mand training opportunities created by the caregivers of children diagnosed with autism. Working with child-caregiver dyads, the researchers used BST to train caregivers to create mand training opportunities by increasing client-establishing operations (EOs) for manding. BST was selected as the intervention based on the results of the PDC-HS, which highlighted training as the area of most concern. Setting a goal of 100% procedural fidelity, the researchers faded feedback upon training mastery criteria being met but continued the intermittent use of brief BST every one to four sessions. As a result of the intervention, mand training opportunities increased from a rate of 0.03–0.17 times per minute during baseline to 0.87–1.57 during BST. Maintenance probes also demonstrated the lasting effects of the intervention, with performance remaining at or above levels observed during the BST phase. The participants also indicated satisfaction with the interventions and observed outcomes, as reported through social validity measures (Melendez et al., 2020).

A similar use of BST was employed by Collier-Meek et al. (2021), who conducted a study with special education paraeducators. The researchers were interested in evaluating how various interventions would improve employee fidelity of implementing student behavior intervention plans, as well as how these improvements affected student engagement and/or the rate of engagement in disruptive behavior. The results of the PDC-HS revealed different areas of concern for the participants; however, the treatment package selected included the use of BST as well as prompts and feedback. Results were favorable for improving behavior intervention plan implementation accuracy for 80% of the participants, but the increased fidelity did not improve student outcomes consistently. However, these results may correspond with student intervention plans not adequately addressing student needs rather than signaling issues with employee performance (Collier-Meek et al., 2021).

In another study concerned with safety in clinical practice, Ditzian et al. (2015) evaluated whether PDC-HS indicated interventions would improve the behavior of therapists properly securing doors within an autism treatment center for clients who engaged in elopement. The PDC-HS identified concerns with consequences; thus, the indicated intervention consisted of verbal and graphed feedback. A nonindicated intervention consisting of visual prompts was also employed to further validate the results of the PDC-HS. Participant percentage of opportunities to appropriately close the doors increased from a baseline range of 1–14% to slightly above this during the nonindicated intervention but further increased to a range of 66–100% during the indicated intervention (Ditzian et al., 2015).

Other employee behaviors contributing to client safety and well-being include following hand hygiene protocols. Hays and Romani (2020) evaluated the effects of a PDC-HS-indicated intervention on such behavior at a specialized psychiatric unit providing treatment to children with intellectual disabilities. Following the completion of the PDC-HS with organizational leaders, a treatment package was implemented consisting of task clarification, goal setting, and feedback. The assessment

signaled performance consequences, effort, and competition as the most elevated PDC-HS domain. All participants improved their performance, with hand hygiene compliance ranging from a baseline of as low as 0% to as high as 100% during the intervention. Additionally, all participants were observed complying with 100% of opportunities during maintenance probes (Hays & Romani, 2020).

The PDC-HS has also been used in organizational settings with employees with intellectual disabilities. Smith and Wilder (2018) used the PDC-HS to interview the managers of a thrift store who supervised employees diagnosed with developmental disorders, whose job responsibilities included correctly tagging clothing items for sale. As a result of the PDC-HS identifying training as the variable of most concern, an intervention comprised of reviewing and modeling the task before delivering performance-based feedback was used until the employees met the training mastery criteria of 80% accuracy. Results demonstrated that accuracy improved from a baseline of 0% for both employees to 90–100% (Smith & Wilder, 2018).

Similarly, Hess et al. (2022) used the PDC-HS while interviewing job coaches working with individuals diagnosed with intellectual disabilities employed at a library. The participants had assigned cleaning duties, such as accurately cleaning shelves, following an eight-step task analysis but were not demonstrating accuracy with this protocol. The results of the PDC-HS identified training and task clarification and prompting as the likely variables contributing to performance deficits. Thus, an intervention consisting of BST with video modeling and voice-over instruction was employed, along with verbal and visual prompts. Training mastery criteria were set at 80%, and results demonstrated that the intervention was effective in increasing accuracy from a baseline range of 4%–50% to above mastery criteria and as high as 95% accuracy. However, one participant required two booster BST training sessions, and only one participant maintained accuracy above mastery criteria during maintenance and generalization probes. Social validity measures did reveal that the participants liked the training strategies used and found the intervention to be helpful. Most participants also reported enjoying participating in the study (Hess et al., 2022).

While much research exists on evaluating the effectiveness of using the PDC-HS to identify adequate interventions to address performance deficits across a variety of individuals, settings, and behaviors, more research is necessary to identify the variables that correspond with favorable outcomes. For example, it is possible that PDC-HS results differ based on who completes the assessment, whether supplemental observations are conducted, or whether it is more beneficial to address one critical question on the tool versus an entire elevated domain. Future research should also investigate the effectiveness of PDC-HS-indicated interventions relative to other organizational behavior management assessments.

As described above, the purpose of PA is to identify barriers to effective employee performance. Once identified, an intervention designed to address these barriers is evaluated. This “indicated” intervention, as is often called, is assessment based and is often contrasted with a nonindicated or nonassessment-based intervention to demonstrate the utility of the assessment-based approach. A variety of assessment-based interventions have been evaluated to improve performance.