

Chapter 2

Treatment Integrity in Autism Spectrum Disorder Interventions

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The last few years have seen a remarkable proliferation of treatment programs to ameliorate the symptoms of autism spectrum disorders (ASD; National Autism Center 2009). In addition, there is an increasing legal and ethical burden placed on the practitioner working with an ASD population to use evidence based interventions (EBI) that have been evaluated in the scientific literature (Detrich 2008). The vast database of interventions and added pressures make the job of the clinician quite difficult—they must sift through competing evidence bases, spectacular statistical claims, and treatments that “wrap themselves in the cloak of science” (Wilczynski et al. 2008, p. 37) in order to find treatment programs that will be effective. Fortunately, there exist a variety of resources to help the practitioner identify an EBI. In fact, this book will serve as a very useful guide to help parents and professionals select potentially effective interventions for children with ASD.

The selection and implementation of EBIs require that professionals consider the construct of *treatment integrity*, both during the research development and dissemination stages. During the selection process, the practitioner will obviously review a good deal of research documenting a variety of experimental research where the EBI is investigated. These studies follow a very typical format: a treatment is outlined a priori, implemented with one or several children, and the effects of the EBI on various symptoms or quality of life indicators is then discussed. However, most research studies do not provide the assurance that the study was carried out in a controlled and prespecified manner, without deviations to the a priori treatment descriptions (i.e., the protocol). Deviations from this protocol cast doubt on the relationship between the treatment and the outcomes, and as such, would decrease the confidence that the reader would have in the strength of that treatment.

After a treatment program has been selected, the practitioner must implement the package as written or as close to its original design as possible. An EBI that is

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applied in a radically different way than how it was described in the literature ceases to be based in evidence and is no better than a haphazard combination of treatments. Treatment integrity, as a construct, factors considerably in the implementation of an intervention.

Treatment Integrity

A critical issue which needs to be demonstrated by researchers and practitioners is the reliable and accurate implementation of an intervention and how true the treatment is to the theoretical and procedural components of the overall treatment model or as intended by the developers of the treatment package (Reed and Coddling 2011; Nezu and Nezu 2008; Dusenbury et al. 2003). This phenomenon is what is typically referred to as *treatment integrity* (also known as *treatment fidelity*, *procedural fidelity*, or *intervention integrity*). The failure to control for treatment integrity can lead to one of three major problems: an inability to evaluate the effects of a program or intervention; the potential lack of improvement among clients and/or consumers; and a host of related ethical and potential legal problems.

First, and most importantly, if the treatment is not implemented with integrity, practitioners and researchers cannot realistically evaluate the effects of the independent variable upon the dependent variable (Kazdin 2011; Cooper et al. 2007). In other words, a lack of treatment integrity decreases confidence in the ability of the treatment to effect changes in the symptomology and quality of life of children with ASD. An unsystematic or careless manipulation of the independent variable can lead to errors in inferential reasoning due to the fact that a distorted or diluted version of the treatment may have been applied (Nezu and Nezu 2008). In these instances, the intervention takes on multiple “lives”—one which exists on paper and one which is actually implemented—both of which may be similar to one another but not exactly the same (Livanis and Mercer 2011).

Second, the implementation of interventions with high rates of treatment integrity is associated with positive treatment outcomes (Hogue et al. 2008; DiGennaro et al. 2005, 2007; Erhardt et al. 1996). Treatment integrity appears to serve to mediate on the effect that the intervention plans had on student outcomes (Cook et al. 2010). In other words, good treatments, when implemented correctly, tend to have positive effects on clients and consumers.

Lastly, within certain systems, the failure to follow a treatment protocol in written form can potentially constitute a denial of certain state and/or federal rights. For instance, under IDEA (2004) it is federally mandated that administrators, teachers, service personnel, and other school staff are trained in the implementation of evidence-based curriculum, practices, and interventions. Within the field of psychology, the push for EBIs has increased tremendously over the past decade and a wide variety of governmental agencies and professional organizations have sought to define EBIs for children with ASD (Reichow and Volkmar 2011). However, an EBI, when not implemented as intended, ceases to be an EBI. Therefore, when considering intervention plans within school systems for children with ASD, a lack of

treatment integrity can potentially be considered to be a deprivation of constitutionally protected due process rights (Cook et al. 2010; Etschdeit 2006), due to the fact that an EBI was technically not provided to the child.

Various professional organizations address treatment integrity within their ethical codes or in collections of best practices for treatment implementation. The American Psychological Association's (APA) policy statement on evidence-based practice in psychology (APA 2005) states that in order to ensure the effectiveness and validity of intervention strategies, systematic review and assessment is necessary; a lack of such evaluation would otherwise be viewed as unethical. The code of ethics mandated by the American Speech-Language-Hearing Association (ASHA 2010) finds that it is ethically necessary for consistent evaluation of services and products to ensure effectiveness and to sufficiently maintain research records of professional services performed. The National Association of School Psychologists (NASP) principles for professional ethics (NASP 2010a) states that, "school psychologists use assessment techniques and practices that the profession considers to be responsible, research-based practice" (p. 7). The NASP model for comprehensive and integrated school psychological services (NASP 2010b) urges school psychologists to use multisource data collection and assessment procedures to ensure effective implementation of EBIs.

Despite the problems that can result from a lack of treatment integrity, the construct is often not measured effectively in studies that evaluate psychological and educational interventions (McLeod et al. 2009; Dusenbury et al. 2003), and in too many instances, not at all. In fact, the measurement and demonstration of treatment integrity often serves as a much more challenging process than the development of effective treatment programs (Foxy 1996). Wheeler et al. (2006) found that only 18 % of the studies of interventions for children actually assessed and reported treatment integrity data. This is a problem for clinicians because the literature that they are reading fails to demonstrate that the protocol was followed reliably and can translate to a lack of adherence by clients, staff, and consumers (Allen and Warzak 2000). In fact, only 1–2 % of practicing school psychologists regularly measured rates of treatment integrity (Cochrane and Laux 2008).

Dimensions of Treatment Integrity

Treatment integrity is described as a multidimensional construct (McLeod et al. 2009), typically consisting of three components (Perepletchikova and Kazdin 2005): treatment adherence, agent competence, and treatment differentiation.

Treatment Adherence

Adherence refers to the reliable use of the procedures as specified a priori by the clinician or researcher. Adherence has been demonstrated to improve dramatically when

those who are implementing the treatment are exposed to some form of consistent and ongoing training or supervision. For example, Hogue et al. (2008) found that the provision of weekly supervision to therapists increased fidelity to the manualized treatment protocols, which in turn led to significant decreases in problem behaviors in an outpatient setting. Coddington et al. (2005) implemented biweekly direct observations and immediate feedback to increase the level of integrity to the treatment plan in a school setting.

Adherence to the treatment protocol is a complex issue, and may be dependent upon the setting that the treatment will be administered as well as the functional levels of the client. The adoption of programs in real-world settings such as clinics, hospitals, and schools often requires some form of protocol flexibility to meet the individual needs of children with ASD or the systemic constraints of the agency that serves children with ASD (Schulte et al. 2009; Dusenbury et al. 2003). As such, treatment protocols (or follow-up research studies) should strive to identify the amount that each component can vary, as well as the relative contribution of each component to the overall outcome. For example, Taylor and Miller (1997) identified which components could be modified in their application of a functional analysis protocol (designed for use in a university clinic setting) for use in a residential hospital setting for the treatment of children with ASD. While the original protocol called for initial assessment to be conducted in a room with which the child was unfamiliar with novel materials, Taylor and Miller conducted the assessment in the classroom with familiar materials, with commensurate results. The researchers still maintained the same conditions that the original protocol highlighted (i.e., the provision of alternating assessment conditions).

Even in situations where some level of individualization was called for, the absolute lack of treatment integrity still poses a problem. Barber et al. (2006) in their evaluation of the treatment integrity of drug treatment found that very high levels, as well as very low levels, of adherence were associated with negative client outcomes, and some level of protocol adaptation was necessary depending on the client's unique situation, as well as the amount and intensity of their symptomologies (Perepletchikova and Kazdin (2005)). However, too much deviation may lead to a situation in which the EBI loses its essential core components. On the basis of this line of reasoning, adherence to ASD interventions may be dependent on the severity of client functioning; perhaps the same interventions need to be applied to children with high and low levels of functioning with different levels of integrity. For example, the use of a token economy to increase desired routines in the home and in the school might need stricter adherence for children with lower levels of functioning (e.g., children with lesser cognitive and language abilities) than when used for children with high levels of functioning. Aspects of the intervention, such as the immediacy of reinforcement, can be allowed to deviate from the protocol, which is useful when the treatment is applied to multiple children simultaneously.

Agent Competence

Agent competence refers to the knowledge base and skill that the individual who is implementing an intervention exhibits (Perepletchikova and Kazdin 2005). Competence may be a dimension whose importance is dependent on the complexity of the intervention—if the intervention procedures are simple, competence may become less of an issue (Schulte et al. 2009; Gresham 2005). For example, competence may not be as important when evaluating an intervention where notes are exchanged between the home and in school but may be important when implementing a school-based behavior plan in nontraditional settings such as a school trip. Since treatment programs designed for children with ASD tend to be more complex and labor-intensive (Livanis and Mercer 2011; Yeaton and Sechrest 1981), the consideration of agent competence should be routine. Researchers must constantly demonstrate that agents have been trained effectively to implement the treatment program at hand. In the field, client and consumer comprehension of the intervention can be conceptualized as a function of agents' access to preservice and continuous in-service training opportunities and the agent's establishment of solid communication patterns with the client or consumer.

The issue of continuous inservice training for agents is a pressing matter. In many situations, the treatment agent may not have had access to preservice opportunities that would have prepared them for program implementation. For instance, parents, teachers, paraprofessionals, as well as hospital and group home workers, might all be asked to implement the same program although each individual may have different educational backgrounds. Therefore, time-efficient methods must be implemented to rapidly develop and maintain competence. Especially in situations where multiple agents are used, the intervention is only as strong as the most limited treatment agent, so it is important that all agents are trained to deliver the intervention.

Sterling-Turner et al. (2001) compared a variety of methods to train undergraduate volunteers in a protocol for issues related to tics: didactic methods, modeling, and a combination of staff rehearsal and feedback were compared and contrasted. The investigating team found that modeling, rehearsal, and feedback worked best to train undergraduates with no particular psychological training to use particular protocols in their interventions. Leblanc et al. (2005) looked at techniques to teach classroom paraprofessionals to implement a behavioral protocol for children with ASD and found that the use of corrective feedback increased competence rapidly. In fact, corrective feedback, or the process of observing agents' in vivo implementation and delivering feedback as to correctly and incorrectly applied components, has been demonstrated to be quite an effective and time-efficient manner to deliver in-service training opportunities to a wide variety of agents (Coddington et al. 2005, 2008; DiGennaro et al. 2005, 2007; DiGennaro-Reed et al. 2010; Mortensen and Witt 1998; Mouzakitis 2010; Noell et al. 1997).

The client's comprehension of the intervention has been shown to increase as a function of the treatment agent's communication strategies (Barber et al. 2006; Cowan and Sheridan 2003; DiGennaro et al. 2005; Gresham 1996). Cowan and Sheridan (2003) found that the highest levels of integrity resulted when all parties

engaged in clear communication patterns, which led to an understanding that the treatment program was under joint ownership. The agent's communication patterns can serve to make the components of the intervention meaningful to the client, thus establishing a better rapport. An agent's knowledge and experience in working with children with ASD may help to modify *how* the intervention is described when the client is the child himself or herself. For example, a competent treatment agent might use some of the child's idiosyncratic language patterns to explain the goals and the processes of the treatment, which may lead to increased comprehension. Teachers and parents appear to prefer interventions to be described to them in practical, common sense terms as opposed to psychological jargon (Elliot 1988; Witt et al. 1984). Overall, while time is a factor that can potentially impact treatment implementation and integrity (Elliot 1988; DiGennaro et al. 2005), there must also be time set aside for communication among all stakeholders.

Treatment Differentiation

Treatment differentiation refers to the extent that the treatment, intervention, or program that is implemented is “pure” and other treatments are not implemented in addition to or instead of the intervention (Perepletchikova and Kazdin 2005). Treatment differentiation is particularly important when two or more treatment programs are compared to one another in the research literature. Specifically, treatment protocols must be reliably distinguished from one another in order to ensure that potential differences in the dependent variable can be attributed to differences in the independent variable (Kazdin 1986).

An issue that can potentially affect differentiation in both the field and in research studies is *therapist drift* (Gresham 2005), where agents may modify the treatment in minor ways over a continuous period of time, thus producing a gradual shift in the independent variable over time. Such drift is often not purposeful but may result due to decreasing levels of diligence, supervision, or boredom. Therapist drift can serve to artificially overestimate or underestimate treatment effects.

Associated Variables

Treatment Complexity

The complexity of a treatment—which is operationally defined as the number of components of a treatment program—can be a very consistent predictor of treatment integrity (Perepletchikova and Kazdin 2005; Allen and Warzak 2000; Gresham 1996; Meichenbaum and Turk 1987; Yeaton and Sechrest 1981). Treatment complexity has the potential to impact programs for children with ASD since these interventions typically include more components and may require more preservice and ongoing

inservice training. At one extreme, complex programs may be applied without integrity but in other situations, treatment programs may not be implemented at all due to their complexity (Yeaton and Sechrest 1981). The second extreme is quite troubling since a good deal of EBIs may not be implemented due to their complexity (or perceived complexity).

Livani and Mercer (2011) described a procedure in which they taught school staff, with minimal preservice training, to implement a set of complex treatment programs to three children with ASD. Treatment integrity was achieved rapidly when a complex program was divided into smaller sections and the staff was presented with these smaller sections in a gradual manner, only when they demonstrated 100 % treatment adherence in previous sections. In essence, the study suggests that a graduated method of program presentation to staff can be useful to guard against the threats of complexity on treatment integrity.

Time Required to Deliver Intervention

Interventions for children with ASD tend to be more complex and as a result, require significantly more time to implement than interventions with children diagnosed with other conditions. The more time needed to learn the procedures in a program and implement them, the greater the threat to treatment integrity (Gresham 1996). Some procedures may not require an inordinate amount of time to implement but may require intensive levels of ongoing supervision and inservice training to maintain at effective levels (Happé 1982). Other treatments require extended periods of administration (typically referred to as *dosage*) due to the severity of the targeted social, communication, or stereotypical behaviors, or due to the comorbid psychiatric issues that also need to be addressed (Perepletchikova and Kazdin 2005). Time is an important variable because it introduces more opportunities for the treatment agent to implement aspects of a program without integrity.

Materials

The materials that are used in various treatment programs can potentially impact treatment integrity. In essence, the more materials needed, the greater the potential threat to treatment integrity (Gresham 1996). However, even a modest amount of expensive or highly technical materials can compromise treatment integrity (Perepletchikova and Kazdin 2005). Limited access to materials that are not commonly found in the school, home, or community can lower treatment integrity. In practical settings, such as hospitals, schools, and other therapeutic facilities, the budget cuts and ongoing financial constraints could potentially impact agents' abilities to access materials. For example, after an agency cuts their budget, the burden for purchasing and maintaining treatment materials will unfortunately fall on the treatment agents, such as teachers, therapists, hospital workers (Mouzakitis 2010), and without

systemic support, there is no guarantee that supplies will be replenished in appropriate quality and quantity. Such issues are important to consider as most programs for children with ASD require a fair amount of materials (e.g., rewards, program sheets, special furniture, therapeutic aides, etc.).

Rate of Change

Treatments that result in rapid changes may be implemented with greater integrity than those that take longer to achieve an effect. Typically, treatments for ASD that demonstrate a broad evidence base will have documented rates of change. It may be helpful to maintain intervention persistence if the treatment agents have a realistic understanding of how long it might take to see any socially significant changes. Fortunately, there are public documents that are available to help program developers identify interventions for autism that have a substantial evidence base. One such document—the National Autism Center’s (2009) National Standards Report (NSR)—is designed to help parents and professionals identify the research base for interventions, and make more informed decisions as to treatments to be used. The NSR categorizes interventions into three broad categories—*established*, *emerging*, and *unestablished*. Interventions in the established category refer to those studies that have a solid research base to demonstrate effectiveness across various age ranges, target difficulties, and diagnostic categories. Emerging interventions are those that show some limited but promising evidence of effectiveness and unestablished interventions show no evidence of effectiveness—in fact, in some instances the interventions are harmful. Established interventions may show improvements in overall functioning much more rapidly than those treatments in the emerging and unestablished categories, and may lead to fewer problems with treatment integrity.

Number of Agents

Most interventions with children with ASD often require that multiple agents implement the same treatment program. In general, the more agents that a treatment requires, the greater the risks to treatment integrity (Perepletchikova and Kazdin 2005; Gresham 1989). This threat can be reliably dealt with if all the agents are in one setting. For example, Koegel et al. (1977) highlighted a procedure to rapidly assess and train 11 teachers of children with ASD by providing in vivo individualized instruction, modeling, and feedback. Later in the study, the authors worked to help the staff members generalize these skills to other situations and groups of children.

However, if the agents are situated in different settings, such threats are difficult to manage. Gresham (1996) indicates that the lack of communication between agents among settings can potentially compromise program integrity—parents, teachers, and individual therapists might not understand which aspects of the program have

been or need to be implemented. Additional problems arise when parents are asked (with little supervision) to implement aspects of a program. In these instances, parents may experience certain procedures as difficult to manage over a continuous period of time, which may cause them to drift from the originally stated procedure (Allen and Warzak 2000). This may be especially true in case of interventions that target more challenging difficulties, such as self-injurious behaviors. Inservice training that places an inordinate focus on the use of verbalizations for training may contribute to this drift. Such a focus on didactic training assumes that parents will develop adequate rules for program implementation based solely on instruction and follow them perfectly, which is an unrealistic assumption (Hayes and Wilson 1993). It is for this reason that a fair amount of training programs for parents (and all treatment agents) should include modeling, role-play, and rehearsal—ultimately, these training techniques need to be implemented on an ongoing basis, *in situ*.

Treatment Acceptability

Acceptability refers to the degree that a particular treatment program is evaluated as fair and reasonable to the referral question (Sterling-Turner et al. 2001), and has been typically implicated as a factor that can potentially impact treatment integrity (Perepletchikova and Kazdin 2005; Lentz et al. 1996; Gresham 1989; Elliot 1988). A number of variables can affect treatment acceptability. For example, acceptability appears to increase for interventions that are suggested for severe problems (Frentz and Kelley 1986; Elliot 1988), even when the interventions are complex and contain a large number of components. It may be the case, that desperation moves clients and consumers to be willing to attempt extreme interventions. In addition, when information is presented regarding the effectiveness of an intervention, acceptability tends to increase (Tingstrom et al. 1989). In fact, simply informing clients and consumers of the nature of the treatment, goals, and potential side effects in simple, everyday language can serve to increase acceptability significantly (Elliot 1988; Singh and Katz 1985; Witt et al. 1984).

However, a study conducted by Sterling-Turner et al. (2001) calls into question the relationship between treatment acceptability and treatment integrity. A central problem of most studies that examined this relationship is that they tended to correlate self-report measures of treatment acceptability and treatment outcome data. In order to correct this deficit in the literature, they collected data on treatment acceptability pretreatment and posttreatment implementation but conducted direct observations of student functioning. They found that clients' treatment acceptability before the intervention and after the intervention was not correlated with treatment integrity.

The relationship between acceptability and integrity appears logical: If an individual does not find a treatment acceptable, they will not implement it faithfully. However, there is a line of research that highlights the incongruence between what people say they will do and what they actually do. From a research perspective, it

would not be unexpected to have a low correlation between self-report data of what people say they will do and actual observations of actions in an environment or what people actually do. In one instance, we are tapping into individuals' verbal reports of one (of many) potential future sequences of behaviors while in the other we measure an actual sequence of behaviors (Lloyd 1994), and such multiple assessment methods rarely result in high correlations (Gresham 1996).

However, the treatment acceptance may still affect integrity in other ways. Acceptance may play a role in the process of treatment selection. Agents that are allowed to select their own treatment, or feel as if they are valued during the treatment development stage, may be more motivated to implement an EBI with higher rates of integrity. Acceptance may serve as a mediator or moderator of treatment integrity in these instances. These agents may feel more committed to the treatment plan and seek out training opportunities or supervision on their own, thus working independently to increase treatment integrity. However, in some instances, the treatment agent may not necessarily agree with the treatment, and may be forced to implement the intervention against their will, based on their employment in a setting that has adopted a particular theoretical orientation (and the interventions that result from it conceptually) in a wholesale fashion. For example, paraprofessionals in school systems and group home workers often have little to no input during the treatment development process.

Measuring Treatment Integrity

Operational Definition of the Treatment and its Components

The treatment and its components should have clear, concise, and specific operational definitions that identify or describe which specific actions that the treatment agent and the client should perform (Cooper et al. 2007). A good operational definition of an independent variable (e.g., the treatment and/or its components) should include four dimensions: verbal (descriptions of scripts to be presented at various times), physical (descriptions of what actions should be performed), spatial (the positioning of materials such as furniture, papers, etc.), and temporal (which actions should follow which environmental events in the program sequence). Such descriptions allow for an easy replication of the intervention, both as a research study as well as in applied settings. However, it is possible that by overspecifying treatments and its individual components, a treatment can be made to appear overly complex, thus potentially affecting treatment integrity (Gresham 1996). One way to minimize this threat is to create two separate operational definitions that target varying levels of specification. The first operational definition would be presented to treatment agents and clients and include a description of each component of the intervention in everyday practical language; the second would include a series of behaviors identified from a task analysis of each component within the larger treatment. In this way, we can maintain the integrity of the intervention without introducing too much complexity.

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