

Monograph on the National Standards Report

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*Superheroes social skills training, Rethink Autism internet interventions, parent training, EBP classroom training, functional behavioral assessment: An autism spectrum disorder, evidence based (EBP) training track for school psychologists*

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## INTRODUCTION

The overarching purpose of this monograph on the National Autism Center's National Standards Report is to provide a description of the level of scientific knowledge that exists in support of the many educational and behavioral treatments that are currently available for individuals with Autism Spectrum Disorders (ASD). The topics that will be reviewed in this paper are as follows: a basic outline and introduction to the National Standards Report, a brief history of clinical guidelines, an overview of the purpose of the National Standards Report and the procedures used to obtain the information used to create the National Standards model, a review of the findings of the National Standards Report, an overview of the recommendations for treatment selection, a brief review of evidence-based practice and how it was applied to the National Standards Report, and an overview of the limitations and future directions of the National Standards Report.

The results from the National Standards Report will also be compared to other evidence-based research papers that have been published in the field of autism research. The Report will also be compared to the definition outlined by the American Psychological Association on what constitutes evidence-based practice. These comparisons will be done in order to determine any similarities and differences between the National Standards Report and other research literature. As the number of children diagnosed with ASD continues to increase, the National Standards Report may be proven to be a helpful tool in determining what intervention/s will be most helpful for these children. It is hoped that parents, caregivers, educators, and service providers will benefit from this resource.

## *Brief Overview of the National Standards Report*

In 2000, the Center for Disease Control and Prevention (CDC) established the Autism and Developmental Disabilities Monitoring (ADDM) Network to collect data that would provide estimates of the prevalence of ASDs and other developmental disabilities in the United States (Centers for Disease Control and Prevention, 2012). The 2000 and 2002 study findings of the ADDM Network showed that approximately 6.7 per 1,000 ( $\approx 1$  in 150) children aged 8 had been diagnosed with an ASD. The number of children aged 8 being diagnosed with an ASD has continued to climb since the initial study was conducted in 2000. Subsequent studies in 2004 and 2006 showed that the prevalence of ASD in children had risen to 8.0 per 1,000 ( $\approx 1$  in 125) children aged 8 years in 2004, and 9.0 per 1,000 ( $\approx 1$  in 110) in 2006 (Centers for Disease Control and Prevention, 2012). It was estimated that the total increase in ASD prevalence rates between 2002 and 2006 was in the range of 27%-95% from the 10 ADDM sites that provided data for these surveillance years. Overall, these results broke down into a total increase in ASD prevalence of 57% over four years among all sites.

More recently, the prevalence has continued to climb. According to recently-released 2008 study findings published by the CDC's ADDM Network, it is estimated that 11.3 in 1,000 ( $\approx 1$  in 88) children aged 8 years in the United States has been identified with an ASD. The rates varied by each ADDM Network site with Alabama being the lowest at 4.8 in 1,000 ( $\approx 1$  in 208) children age 8 and Utah being the highest at 21.2 in 1,000 ( $\approx 1$  in 47) children age 8. The 14 sites that participated in this study collected data from both education sources and health sources. Ten of the 14 sites were able to access both education and health records, and are considered to represent all children with ASDs more completely than results from either source alone (Centers for Disease Control and Prevention, 2012).

The National Standards Report is the result of a multi-year research project headed by the National Autism Center. The National Autism Center is part of the May Institute, which is a nationwide network of programs and service provider for autism-related services. The National Autism Center's main focus is to promote evidence-based practice in the treatment of autism. The National Autism Center is a non-profit organization that "identifies effective programming and shares practical information with families about how to respond to the challenges they face. The center also conducts applied research as well as develops training and service models for practitioners. Finally, the Center works to shape public policy concerning ASD and its treatment through the development and dissemination of national standards of practice (National Standards Report, 2009).

With the increased prevalence of autism in the United States the National Autism Center sought to create a comprehensive document that catalogued the myriad of treatments for autism and the research that supports these treatments. Through the collaboration of many experts in the field of autism research the National Autism Center was able to create a catalogue, known as the National Standards Report. According to the National Standards Report its primary is to "provide the strength of evidence supporting educational and behavioral treatments that target the core characteristics of ASD, describe the age, diagnosis, and skills/behaviors targeted for improvement associated with treatment options, identify the limitations of the current body of research on autism treatment, and offer recommendations for engaging in evidence-based practice for ASD" (National Standards Report, 2009).

It is hoped that the National Standards Report will provide an easily accessible tool for parents, educators, and other professionals working with children with ASD in order to help in the treatment decision making process. It is also hoped that by providing a more comprehensive

resource for making treatment decisions care-related costs may be reduced. According to statistics released by the CDC, it is estimated that it will cost society 3.2 million dollars for each individual with an autism spectrum disorder across their lifespan (Centers for Disease Control and Prevention, 2012). According to those who have done research in the area of autism treatment, it is estimated that “with effective treatment, the lifetime costs can be reduced by 65%” (Jarbrink, McCrone, Fombonne, Zanden, & Knapp, 2007). “In light of these facts, many families, schools, and medical and social service systems are choosing to invest their resources on treatments for autism that have already been scientifically established as effective” (National Standards Report, 2009).

### *Brief History of Clinical Guidelines*

In recent decades the standard for research and practice “in the fields of medicine, psychology, education, and allied health” has focused on evidence-based practice (National Standards Report, 2009). The overarching principles of evidence-based practice “are that all practical decisions made should: 1) be based on research studies and 2) that these research studies are selected and interpreted according to some specific norms” (Hjorland, 2011). The use of evidence-based practice has become critical in the field of Autism Spectrum Disorders. However, many of the current clinical guidelines for the treatment of ASD are limited.

According to the National Standards Report current clinical guidelines have become outdated because much of the research, and the reviews of the research were conducted before the turn of the 21<sup>st</sup> century (2009). The collaborators on the National Standards Report also concluded that these reviews did not include all of the literature on educational and behavioral treatment studies. They further concluded that the literature did not include different ASD diagnoses, and it did not include a broad range of ages (National Standards Report, 2009).

Another limitation mentioned in the National Standards Report was that the guidelines for evidence-based practice have evolved over the years. It is now much more common for “evidence-based practice guidelines to show each aspect of [the decision making process]” (National Standards Report, 2009).

The National Standards Report sought to address the current limitations of clinical guidelines in three ways. First, a thorough review of the existing educational and behavioral literature for ASD was conducted. Literature was reviewed for research that was published from the year of 1957 up to the fall of 2007. After the literature was collected and reviewed, reviewers categorized the information according to “treatment effectiveness based on age, diagnostic groups, and treatment targets” (National Standards Report, 2009). Finally, the reviewers sought to make every aspect of the review process transparent by seeking feedback from professionals and parents, as well as other experts in the field of ASD research.

#### *Purpose and Procedures for the National Standards Report*

The National Standards Report serves three main purposes, the first of which is “identify the level of research support currently available for educational and behavioral interventions used with individuals (below 22 years of age) with Autism Spectrum Disorders (ASD)” (National Standards Report, 2009). This was done in order to help identify and categorize those interventions that are most effective at addressing the core symptoms of ASD. According to the National Standards Report and in accordance with evidence-based practice knowledge concerning the levels of research support available for treatments is a critical component when selecting treatments that are appropriate for individuals with an ASD (2009).

The second purpose of the National Standards Report is “to help parents, caregivers, educators, and service providers understand how to integrate critical information in making

treatment decisions” (National Standards Report, 2009). Special emphasis was placed on evidence-based treatments and making the empirical evidence supporting these treatments more understandable to those individuals (i.e., parents, caregivers, and educators) less acquainted with evidence-based practice. The collaborators on the National Standards Report defined evidence-based practice as “the integration of research findings with {a} professional judgment and data-based clinical decision making, {b} values and preferences of families, and {c} assessing and improving the capacity of the system to implement the intervention with a high degree of accuracy” (National Standards Report, 2009).

The third purpose of the National Standards Report is “to identify limitations of the existing treatment research involving individuals with ASD” (National Standards Report, 2009). The collaborators of this project wanted to do this in order “to extend favorable outcomes to all age groups, diagnostic groups, or skills/behaviors that may be targeted for improvement” (National Standards Report, 2009) for which treatment outcomes have been shown to be effective.

The National Standards Report initially began as the collaborators and researchers involved with the project developed a model for which research articles could be evaluated according to a standardized set of review guidelines. These guidelines were created in order to help article reviews and researchers ascertain the scientific merit that each research article contributed to the body of research literature on treatments and interventions for ASD. According to the National Standards Report the model was developed “based on an examination of evidence-based practice guidelines from other health and psychology fields as well as from 25 experts” (2009), who were in attendance at the planning meetings for this project. The model was further modified based on the feedback that was received following planning sessions.

The next task that was undertaken following the creation of the model for article review was to identify the research and begin the sorting process. As a result, 6,463 abstracts were identified through internet search engines, and 575 additional abstracts were identified by the expert panels involved with the project. Once the research was identified inclusionary and exclusionary criteria had to be applied to help determine whether or not the article warranted further scrutiny. During this process a total of 5,978 articles were removed from consideration for this project, leaving 1,060 for review. The majority of articles were removed because it was determined that the articles were not related to autism, the treatment of autism, and were not empirical studies (National Standards Report, 2009). The remaining articles were further reviewed according to the inclusionary and exclusionary criteria. This resulted in 413 more articles being removed. Expert panels later determined that 77 more articles met the inclusionary criteria bringing the total number of articles reviewed to 724. “Because more than one study was published in several of these articles, a total of 775 studies were retained for final analyses” (National Standards Report, 2009).

The articles that were excluded from this project were excluded according to five criteria that were established by the National Standards Project research team. The first criterion for exclusion limited the articles that were reviewed to educational and behavioral treatments only. The only non-educational and behavioral treatments included in the review were curative diets. The researchers decided to include curative diet studies “because professionals across a wide range of settings are often expected to implement [these diets] with a high degree of fidelity” (National Standards Report, 2009).

The second reason for exclusion was related to co-morbid conditions. Studies that included children with co-morbid conditions that are not commonly co-morbid with an ASD



were excluded. This was done in order to prevent the outcomes from being skewed. For instance, if study participants with ASD also had a co-morbid major medical disorder, it would have been too difficult to determine what effect the treatment had on the symptoms of ASD alone.

The third and fourth criteria were directly related to the type of study, the purpose of the study, and the data that were produced or presented. Non-empirical studies were not included. Studies were also excluded if they mainly looked at mediating or moderating variables. The main objective of the National Standards Project was “to identify which treatments have solid research evidence showing that they are effective, as opposed to when treatment effects will hold, or how/why these effects occur” (National Standards Report, 2009). The fifth and final reason for exclusion was age. This report only focuses on young individuals (i.e., under age 22). Research articles were excluded if they included participants that were over the age of 22.

Studies were included for consideration if treatments could be implemented in school systems, early intervention, home, hospital and community-based programs. Studies were also included if individuals with ASD were the target of treatment studies. Finally, research articles were also included if they had been published in peer-reviewed journals.

As part of the article review process, all reviewers had to be trained to criterion (National Standards Report, 2009). This was done in order to ensure that all reviews were completed at a high level of fidelity. The coding manual that was used by reviewers was created by the pilot team. The pilot team “reviewed articles and made modifications to the coding manual until they could readily establish an acceptable level of agreement (interobserver agreement > .80)” (National Standards Report, 2009). Once the coding manual was established, article reviewers were given the manual and one article to review. All reviewers were able to maintain an

acceptable level of interobserver agreement with the exception of four individuals (National Standards Report, 2009). The reviews of the individuals who failed to meet reliability were removed.

The Scientific Merit Rating Scale (SMRS) was the instrument that was designed in order to evaluate the methodology of the studies that were being reviewed. The SMRS consists of five critical domains “of experimental rigor that can be applied to determine the extent to which interventions are effective” (National Standards Report, 2009). These domains are as follows: research design, measurement of the dependent variable, measurement of the independent variable or procedural fidelity, participant ascertainment, and generalizability. The collaborators for the National Standards Report defined each of the five domains clearly and precisely in order to maintain transparency.

The design of a research study was defined as “the degree to which experimental control was demonstrated. Research design is tied to the number of participants and/or groups involved, the extent to which attrition or treatment disruption occurred, and the type of research design employed” (National Standards Report, 2009).

The measurement of the dependent variable describes the degree to which “accurate and reliable data were collected, and how well these data represent the most direct and comprehensive sample of the target skill or behavior that is possible. Measurement of the dependent variable is tied to the type of measurement system used, the psychometric support and/or reliability for dependent variables, and the extent to which evaluators were blind and/or independent when tests, scales, or checklists served as the dependent variables”(National Standards Report, 2009).

Measurement of the independent variable “describes the extent to which treatment fidelity was adequately established. Treatment fidelity is tied to implementation accuracy, the percentage and type of sessions during which data were collected, and the extent to which treatment fidelity was reliably measured” (National Standards Report, 2009).

Participant ascertainment “refers to the degree to which well-established diagnostic tools and procedures were used to determine eligibility for participant inclusion in the study and the extent to which diagnosticians and evaluators were independent and/or blind to the treatment conditions. Participant ascertainment is also tied to the use of Diagnostic and Statistical Manual for Mental Disorders or International Classification of Diseases criteria” (National Standards Report, 2009).

Generalization “is defined as the extent to which researchers attempted to objectively demonstrate the spread of treatment effects across time, settings, stimuli, responses, or persons. Generalization is also tied to the type of data collected (e.g., objective versus subjective)” (National Standards Report, 2009).

For each of the five areas listed above reviewers gave a score from zero to five to indicate the scientific merit of each area. A score of zero represented a poor/weak score, and a score of five represented a strong score. Once all five dimensions were scored, the individual dimension scores were combined to give a composite score for the article as a whole. The composite score was called the SMRS score (National Standards Report, 2009). The collaborators for the National Standards Project gave the formula that they used in order to determine the composite score, and is as follows: “Research Design (.30) + Dependent Variable (.25) + Participant Ascertainment (.20) + Procedural Integrity (.15) + Generalization (.10)” (National Standards

Report, 2009). SMRS scores of 3, 4, or 5 indicated that sufficient scientific rigor had been applied. Scores of 2 provide initial evidence about treatment effects, but more research is needed. Scores of 0 or 1 indicated that insufficient scientific rigor had been applied.

Once an SMRS score was obtained for each article, the researchers involved with this project further wanted to know if the treatment effects in each article were “beneficial, ineffective, adverse, or unknown” (National Standards Report, 2009). The researchers defined each of the above listed treatment effects as follows. Beneficial treatments were those treatments that demonstrated sufficient evidence to support favorable outcomes that resulted from the particular treatment. Ineffective treatments were those treatments that failed to demonstrate sufficient evidence supporting favorable outcomes. Treatments received the classification of Unknown when there was not enough information to determine a treatment’s effectiveness. Finally treatments were identified as Adverse when there was enough research evidence to show that a treatment produced negative or harmful effects (National Standards Report, 2009).

It should also be noted that different criteria were developed for group research design, single-subject research design, and alternating treatments design. The criteria for group research design looked at whether or not there were statistically significant differences reported. When no differences were reported, the researchers evaluated whether or not the design would lead to the possibility of finding an effect. Treatment effects for single-subject research designs were “based on whether or not a functional relationship was established, as well as on the number of treatment effects that were attempted and demonstrated” (National Standards Report, 2009). Finally, for the alternating treatment design, treatment effects were classified “based on the extent to which separation was reported, carryover effects were minimized, and number of data points were sufficient” (National Standards Report, 2009).

Once all of the articles that were saved for further review were coded according to the SMRS and the treatment effects ratings, these results were combined in order to determine “the level of research support currently available for each educational and behavioral intervention” that was examined (National Standards Report, 2009). This process yielded a total of 38 treatments. The term treatment, as used by the researchers for this project, represented “either intervention strategies (i.e., therapeutic techniques that may be used in isolation) or intervention classes (i.e., a combination of different intervention strategies that hold core characteristics in common)” (National Standards Report, 2009). The researchers sought to combine intervention strategies into intervention classes in order to provide greater clarity concerning the effectiveness of the treatment (National Standards Report, 2009).

In addition, researchers on this project sought to combine intervention strategies into treatment categories that would be understandable to parents, educators, and service providers. Treatment approaches were combined when the treatments were substantially similar or held core characteristics. As a result the strength of evidence classification system was developed. This system allowed the researchers to classify each of the 38 identified treatments into one of four strength of evidence categories: established, emerging, unestablished, and ineffective/harmful. “The strength of evidence ratings reflect the quality, quantity, and consistency of research findings that have been applied specifically to individuals with ASD” (National Standards Report, 2009).

Researchers for the National Standards Project defined each of the four strength of evidence ratings as follows: treatments classified as established were those studies that demonstrated that “sufficient evidence [was] available to confidently determine that a treatment produced beneficial treatment effects for individuals on the autism spectrum” (National

Standards Report, 2009). Treatments classified as emerging were those that had a few studies that demonstrated the treatment produced beneficial effects, but more research is needed in order to “consistently show this outcome before [firm conclusions can be drawn] about treatment effectiveness” (National Standards Report, 2009). Treatments that received the classification of unestablished were those treatments that demonstrated “little or no evidence” that would allow for researchers “to draw firm conclusions about treatment effectiveness with individuals with ASD. Additional research may show the treatment to be effective, ineffective, or harmful” (National Standards Report, 2009). Lastly, treatments were classified as ineffective/harmful if there was “sufficient evidence to determine that a treatment [was] ineffective or harmful for individuals on the autism spectrum” (National Standards Report, 2009).

The researchers on this project wanted to do more than just state whether or not the treatment was effective or not, but they also to provide more information on how the treatment was effective in order to better help those making treatment decisions for individuals with an ASD. In order to do this the research team sub-classified each of the treatments once a treatment was identified as being effective. The researchers sought to answer each of the following questions: “Have favorable outcomes been demonstrated when a specific skill or behavior is targeted for improvement with individuals with on the autism spectrum?, Have favorable outcomes been demonstrated with a particular age group of individuals with ASD?, and Have favorable outcomes been demonstrated with a specific diagnostic group (e.g., Autistic Disorder, Asperger’s Syndrome, PDD-NOS)?” (National Standards Report, 2009).

In order to sub-classify the treatments the researchers had to first identify all of the studies associated with a particular treatment. Next they had to identify all of the relevant variables for each of the studies being reviewed. Relevant variables included: treatment targets,

skill increases, behavioral decreases, age of the participants, and diagnostic group (e.g., Autistic Disorder, Asperger's Syndrome, or PDD-NOS). Once this identification process was complete, researchers then had to identify the SMRS score and the Treatment Effects Ratings for each of relevant variables for each study. "For each relevant variable (treatment target, age group, and diagnostic group), identify the quality, quantity, and consistency of research findings across all studies for a given treatment" (National Standards Report, 2009). Finally, researchers had to determine if there was enough evidence to demonstrate that a treatment produced favorable outcomes. This determination was made based on the SMRS score that each study received. Studies that received scores of 2, 3, 4, or 5 showing beneficial treatment effects were "selected in order to increase the chances that [researchers] would identify any variables associated with favorable outcomes" (National Standards Report, 2009).

"There are many different skills or behaviors targeted for improvement when working with individuals with ASD" (National Standards Report, 2009). Some treatment targets seek to improve skills by increasing developmentally appropriate skills. Researchers identified ten skill areas in this category. The ten areas identified are: academic, communication, higher cognitive functions, interpersonal, learning readiness, motor skills, personal responsibility, placement, play, and self-regulation. Other treatments are intended to improve life functioning by decreasing problem behaviors, four skills were identified in this category. The four areas identified were general symptoms, problem behaviors, restricted, repetitive, nonfunctional patterns of behavior, interests, or activity (RRN), and sensory or emotion regulation (SER) (National Standards Report, 2009). Treatments were also sub-classified according to age groups and diagnostic groups (e.g., Autistic Disorder, Asperger's Syndrome, or PDD-NOS), and what treatments were reported to be most effective for each age group and each diagnostic group.

### *Review of the Findings from the National Standards Report*

Eleven treatments were identified as established treatments for individuals with an autism spectrum disorder. These treatments demonstrated beneficial effects in several well-controlled research studies. The 11 identified treatments are as follows: antecedent package, behavioral package, comprehensive behavioral treatment for young children, joint attention intervention, modeling, naturalistic teaching strategies, peer training package, pivotal response treatment, schedules, self-management, and story-based intervention package. Results for the treatment targets for the established treatments showed that the antecedent package, behavioral package, and comprehensive behavioral treatment for young children demonstrated favorable outcomes with more than half the skills that are often targeted to be increased. The behavioral package demonstrated favorable outcomes with 3/4 of the behaviors that are often targeted to decrease. The established treatments also demonstrated favorable outcomes with many different age groups and diagnostic groups (National Standards Report, 2009). It should be noted that despite the fact that the 11 established treatments have been shown to be effective, this does not necessarily mean that these treatments will be effective for all individuals with ASD. When selecting a treatment caregivers and professionals must consider the particular symptoms being targeted for treatment and the child's IQ.

Emerging treatments were those treatments for which one or more studies suggest the intervention may produce favorable outcomes. A large number of studies fell in the Emerging level of evidence and are as follows: augmentative and alternative communication device, cognitive behavioral intervention, exercise, exposure package, imitation-based interaction, initiation training, language training (production), language training (production & understanding), massage/touch therapy, multi-component package, music therapy, peer-mediated



instructional arrangement, picture exchange communication system, reductive package, scripting, sign instruction, social communication intervention, social skills package, structured teaching, technology-based treatment, and theory of mind training (National Standards Report, 2009).

The following treatments were those for which little or no evidence could be drawn from the literature that allowed the researchers to draw firm conclusions about the effectiveness of these interventions for individuals with ASD: academic interventions, auditory integration training, facilitated communication, gluten and casein-free diet, and sensory integrative package. These treatments were identified as Unestablished treatments due to the lack of quality, quantity, and consistency of the research findings for these particular treatments. There were no treatments that had sufficient evidence to be rated as ineffective or to produce harmful outcomes. This result is not surprising because once a treatment is noted to be having a negative or harmful effect, research on that particular treatment stops. “Ethical researchers are not going to then apply these ineffective or harmful treatments specifically to children or adolescents on the autism spectrum just to show that the treatment is equally ineffective or harmful with individuals with ASD” (National Standards Report, 2009).

#### *Overview of the Recommendations for Treatment Selection*

One of the main purposes behind the creation of the National Standards Project was to provide parents, educators, caregivers, and professionals a more comprehensive resource on the treatments that have been shown to be effective in the treatment of ASD. The selection of an appropriate treatment for an individual with an ASD is a critical decision that “should be made by a team of individuals who can consider the unique needs and history of the individual with ASD along with the environments in which he or she lives” (National Standards Report, 2009).

The results from the National Standards Report may be used to help in treatment selection. No matter what resources service providers choose to use, it is best to select an evidence-based practice approach. It is best to select an evidence-based practice approach because these treatments have demonstrated reliable treatment effects in the research literature across different studies.

The researchers on this project have provided recommendations based on the research findings of the National Standards Report. The treatments that were identified as Established treatments in the National Standards Report have sufficient evidence of treatment effectiveness. It is recommended that decision-making teams give serious consideration to these treatments. “However, it should not be assumed that these treatments will universally produce favorable outcomes for all individuals on the autism spectrum” (National Standards Report, 2009). Researchers also recommended that decision-making teams do not begin with emerging treatments, as there is limited research support for these treatments. However, these treatments should be given serious consideration if the decision making team determines that an established treatment may not be appropriate for a particular individual. Given how little is known about unestablished treatments, these treatments should only be considered after additional research has been conducted (National Standards Report, 2009).

#### *Evidence-Based Practice and Its Application to the National Standards Report*

As stated earlier, the overarching principles of evidence-based practice “are that all practical decisions made should: 1) be based on research studies and 2) that these research studies are selected and interpreted according to some specific norms” (Hjorland, 2011). The researchers involved with the National Standards Project used the principles of evidence-based practice to guide the article identification and review process involved with this project. In the

process of reviewing and preparing the National Standards Report four contributing factors of evidence-based practice were identified as being critical to the selection of an appropriate treatment for an individual with ASD. These four factors are: research findings, professional judgment, values and preferences, and capacity.

With regards to research findings the strength of evidence ratings for all treatments being considered must be known. Those treatments that received an Established rating should be considered first because there is enough evidence to demonstrate that these treatments have produced favorable results. Professional Judgment refers to the judgment of professionals who have expertise in ASD. This expertise must be taken into consideration because these individuals may have in depth knowledge about what treatments are available and which of the treatments have been shown to have a positive effect for individuals on the spectrum. It is also important to consider the values and preferences of parents, care providers, and the individual with ASD. A treatment may be effective with individuals with ASD in the research literature, but if the treatment goes against family values, or the individual with ASD is against a particular treatment, the treatment is likely to be ineffective for that individual. Capacity refers to the ability of treatment providers to be able to provide particular treatments. Treatment providers should be well positioned to correctly implement the intervention.

#### *Limitations and Future Directions for the National Standards Report*

The following limitations with the National Standards Report have been identified. First, this document only focused on research with individuals with ASD under the age of 22. The second limitation dealt with the determination of the categories for treatments. There was some argument between researchers about unit analysis size (i.e., large or small). In the end researchers just attempted to create categories that “made sense” (National Standards Report,

2009). The third limitation pertains to the research review. The research review included an examination of most group and single-subject research design studies, but did not include every type of study. Fourth, there was not a training session held prior to field reviewers examining the pilot article in order to establish inter-observer agreement. Fifth, articles written in a language other than English were not included. Sixth, The National Standards Project did not evaluate the extent to which treatment approaches were studied in “real world” versus laboratory settings. Lastly, intensity level required for delivery of the interventions included in this report was not determined. This report only includes research that was published prior to September 2007 when the literature review phase of this project ended. This report also does not include other areas that may be important when selecting treatments (i.e., cost-effectiveness, social validity, studies that examined mediating and moderating variables).

In order to address some of the limitations listed above the researchers on the National Standards Project have proposed the following future directions that may be incorporated in later iterations of the National Standards Report. In a later edition of the National Standards Report researchers have suggested that a review of research literature that covers the lifespan be conducted. Researchers also recommended that qualitative studies or other types of peer-reviewed studies that were excluded be included for consideration. Researchers also hope to modify the treatment classification based on feedback from experts in the autism community. Researchers also feel that it will be important to examine the extent to which treatments have been studied in “real world” settings in order to give parents, teachers, and treatment providers with greater information on treatment effectiveness. Finally, researchers have proposed that reviewers who can accurately interpret peer-reviewed articles that are published in non-English journals be added to future research teams.

## *Conclusions*

The National Standards Project sought to follow the core principles of evidence-based practice. The process for defining what studies would be included in this project was rigorous, and time consuming. All studies that were eventually included in the final report had gone through multiple reviews, during which, these studies were determined to be demonstrative of evidence-based and validated research in the area of autism treatment. The process of defining which studies met criteria for inclusion for this report was similar to the process used by other researchers in the field of autism research.

In an article published by Rogers and Vismara (2008), they used a similarly restrictive set of inclusion criteria for the articles they included in their study. The criteria they used are as follows: articles utilized a comprehensive treatment approach (address language, social, cognition, play), participants were age 5 and younger, only controlled group designs/ single-subject multiple baseline designs were used, studies had 3 or more subjects, and the studies were published in peer-reviewed journals. The inclusion criteria were, in part, influenced by the criteria outlined in the Chambless et al. (1996) article written on the topic of determining treatment efficacy. Although not specifically mentioned in the National Standards Report, it seems likely that the Treatment Effects Ratings for the National Standards Project were shaped by the definitions given for effective treatments in Chambless et al. (1996). Chambless et al. (1996) divided treatments into three categories: well-established: treatment manuals, showing better effects than placebo, probably efficacious: clearly specified participant groups (treatment manual preferable but not required), better outcomes than non-treatment control/placebo/; equivalent to an established treatment, and possibly efficacious.

The objectives of the Rogers and Vismara article were to identify the most efficacious early interventions, better identify the variables leading to improved outcomes following interventions, and show which interventions/treatments had short and long-term improvements and give the degree of these improvements. Once the objectives and inclusion criterion were defined, Rogers and Vismara (2008) listed the articles that they reviewed that met the objectives and inclusion criterion. In the Rogers and Vismara article the principle of transparency was very evident, as each step of the literature review process was laid out for the reader, just as each step was laid out in the National Standards Report. At the end Rogers and Vismara were able to provide a list of practical implications for practitioners and parents.

According to the American Psychological Association, “evidence-based practice is the integration of the best available research with clinical expertise in the context of patient characteristics, culture and preferences” (American Psychological Association, 2013). The researchers on the National Standards Project met this definition of evidence-based practice as they sought to compile a comprehensive listing of effective interventions/treatments for autism spectrum disorders. In conclusion, the National Standards Report is a useful tool for parents, educators, and other professionals who work with children with ASDs. The use of evidence-based practice has led to a better understanding of what works and what does not in the autism treatment literature that is currently published. The use of evidence-based practice will continue to be important going forward, as it gives researchers a common set of standards for conducting research. This, in turn, will make it easier for treatment decision making teams to turn to the literature and choose a treatment that has been shown to have effective outcomes for participants.

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