Rethink Autism: An overview of a web-based model of services for children with autism.

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Summer, 2013

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

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Manuscript Edited Date: August 24, 2013

Introduction

The intent of this monograph is to present and evaluate Rethink Autism, a web based program designed to provide services to families, caregivers, and professionals who support individuals with autism spectrum disorder (ASD). Rethink Autism is an amalgamation of numerous evidence-based practices delivered to consumers via online training, instruction, and learning video seminars. The goal of Rethink Autism is to facilitate the access that all families and communities have to effective treatment tools so that individuals with autism can be provided with the skills necessary to succeed and attain the greatest degree of autonomy in our world.

The core principles behind Rethink Autism are based on applied behavior analysis (ABA). ABA utilizes a number of behavioral principles in determining the most effective methods to promote positive behaviors and suppress maladaptive or difficult behaviors. Decades of research have revealed ABA to be the most widely supported treatment for individuals with ASD (NAC, 2009). Rethink Autism uses ABA principles in nearly every domain of services provided, from discrete trial instruction to illustrated data collection techniques. Rethink Autism also provides training and support for the execution of Functional Behavior Assessments (FBA), as well as for the development of Behavioral Intervention Plans (BIP).

In addition to Rethink Autism's strong foundation in ABA, each service component was selected for use following a thorough research review to ensure that all components were evidence-based and effective practice. Some of these include video modeling, errorless and incidental teaching, and models of both academic and adaptive lesson plans based on the core curriculum. Each of these components will be addressed in greater detail in the body of this manuscript.

Finally, and not to be overlooked, Rethink Autism provides a number of additional resources and services that are intended to be of specific and immediate use to all families and communities. These resources are not linked to the instructional component of Rethink Autism per se; however, they offer valuable insights into the nature of autism spectrum disorder, how to navigate the educational system and special education, and recent developments in scientific and popular news. Included in this domain are mailing lists with Rethink Autism's "Tip of the Week," archived webinars delivered by experts in the field, a community-driven Q&A for specific issues, and a blog for a variety of everyday joys and hurdles of ASD.

While no published outcome studies focused entirely on Rethink Autism are available at present, the evidence behind each of the components will be reviewed and evaluated for scientific merit and appropriateness in application. It is often difficult to determine which components are the most effective, but this manuscript will attempt to determine a reliable estimate for the evaluation of Rethink Autism as a model. From this, consumers may make reasonable conclusions regarding the utility and applicability of Rethink Autism.

Following an in-depth analysis of each component of Rethink Autism and its implementation, this manuscript will present evaluations of the program, including current benefits and applications of Rethink Autism as well as limitations and future areas of research. These strengths and limitations will be discussed in terms of their alignment with the National Standards of Evidence-Based Practice. Finally, a proposed model for the delivery of Rethink Autism which purports to maximize program effectiveness with minimal cost investment via graduate students and granting agencies will be presented.

General Description of Rethink Autism

Mission, Goals, and Beliefs

Rethink Autism is a web-based program that is designed to provide effective services to those who work with and teach individuals with autism spectrum disorders. The mission of Rethink Autism is as follows (www.rethinkautism.com):

> *"Offering parents and professionals immediate access to effective and affordable Applied Behavior Analysis-based treatment tools for the growing population affected by autism spectrum disorders."*

The goal of Rethink Autism is that by increasing the availability and affordability of empirically-supported services, a much larger number of families and communities will be able to help students and children with autism make greater gains, resulting in more successful and autonomous futures. In pursuit of these goals, the Rethink Autism program has arrived at four core beliefs: 1) Everyone should have access to early and effective intervention; 2) Every parent and teacher can make a difference every day; 3) Every child can learn a diverse range of meaningful skills; and 4) Interventions based on applied behavior analysis (ABA) are the most effective (www.rethinkautism.com).

These beliefs reflect a combination of societal and humanitarian values as well as empirical commitments to evidence-based practices. It is desirable for every child to achieve their maximal potential and every teacher or caregiver to feel that they are making a difference, but service providers have a greater responsibility than simply hoping for the best outcomes. There also exists the responsibility to know and employ the strategies that have been scientifically researched and determined to be the most effective for the population. The goals of Rethink Autism were developed from the conjunction of each of these paradigms to ensure the program delivers service components that contain both ethical and empirical rigor.

<u>Leadership Team and Scientific Advisory Board</u>

As mentioned above, Rethink Autism includes a Leadership and Development Team and a Scientific Advisory Board. Briefly, the principal players in the leadership team include Daniel Etra (Chief Executive Officer), Evan Rosenthal (Chief Operations Officer, President), Jamie Pagliaro (Chief Learning Officer, Vice President), and Bridget Taylor (Psy.D., BCBA, Senior Clinical Advisor). These New York based individuals, as well as their support staff in multiple sites nation wide, are responsible for the final content and operations of Rethink Autism. In order to assure that they are provided with the most accurate and reliable information, they have developed a multidisciplinary Scientific Advisory Board. This board is comprised of medical doctors, psychologists, psychiatrics, behavioral analysts and educators. The research and professional interests of each committed member of the Advisory Board are both extensive and varied, providing Rethink Autism with expert advice for each component of the program.

Programs

Rethink Autism is embodied by three different program arms: Personal, Organizational, and Supervision. Each program follows the core beliefs of Rethink Autism, but is differentiated in the type of services provided and the structure of certain components.

<u>Personal</u>

The personal account is ideal for parents, caregivers, and teachers with three or fewer individuals with autism. This home-based platform allows parents and service providers access to the skills inventory assessment, all curriculum and lesson materials, video guided instruction for ABA techniques and principles, Individualized Education Program (IEP) building programs, as well as the data recording, progress monitoring and decision making software for as many as three children. The cost of the program ranges from $50.00 to $89.00 per month, with lower cost

associated with a longer commitment and more children in the program. Professional Curriculum Support can be added for $25.00 per month, which provides greater analysis of curriculum development, lesson selection, and training resources.

Organizational

Organizational accounts are ideal for school, clinical, and social work settings in which there is a large number of individuals with autism spectrum disorders who will be receiving treatment. This platform offers a number of valuable services including team-to-team support for a variety of professionals who will be delivering Rethink Autism, online assessment to support multiple students, staff training in ABA techniques, multi-site collaboration and district-wide analytics. This support also includes curriculum development, lesson selection, and direct consultation for Functional Behavior Assessment and Behavior Intervention Planning. The cost for this service is dependent upon the scale and nature of each setting.

Supervision

Rethink Autism provides intensive supervision services for those in pursuit of degrees in Board Certified Behavior Analysis (BCBA). This service is provided in accordance with the Behavior Analyst Certification Board and through multiple supervisors over the course of 12-18 months to fulfill no fewer than 75 hours of supervision. The supervision platform is offered online, and as such can reach any location in the world with internet access. This includes access to Rethink Autism training videos, ABA-based tool kits, video conferencing, and online resources. There is also a discussion topic every two weeks selected from one of over 30 relevant domains, ranging from ethical issues to behavioral techniques. Weekly supervision can be from a licensed BCBA (total cost: $5,625.00) or from a Board Certified Assistant Behavior Analyst (total cost: $3,750.00).

Components

ABA and DTT

The foundation of Rethink Autism is Applied Behavior Analysis, which is taught through Discrete Trial Training (DTT). Multiple domains of study, including original empirical articles, meta-analyses, and national initiatives have revealed that ABA is the most effective treatment paradigm for children with ASD (Granpeesheh, Tarbox & Dixon, 2009; Lovaas, 1987; Virues-Ortega, 2010). ABA is based on operant learning strategies which stipulate that the consequences of a behavior have a strong influence on the likelihood of that behavior occurring in the future. If a behavior is reinforced (e.g. rewards, attention, or getting out of something), operant learning argues that behavior is more likely to happen again. Conversely, if a behavior is punished (e.g. time out, loss of privileges), the behavior is less likely to happen again. ABA uses these principles to increase rates of positive responding and decrease rates of negative responding through immediate delivery of consequences (Myers & Johnson, 2007).

Discrete trial training refers to the breaking down of larger, more complex behaviors into smaller behaviors. These smaller behavioral components can be prompted, demonstrated, and either reinforced or ignored in a very brief period (Lovaas, 1987; McEachin, Smith & Lovaas, 1993). In doing so, multiple trials can be given in a very short amount of time, and students are able to understand more clearly what behaviors are expected of them. These discrete trials have been effective in teaching children valuable requisite academic skills (e.g. attention, compliance) as well as discrimination learning skills (Myers & Johnson 2007). Both ABA and DTT have been consistently linked to beneficial outcomes and are recommended as the first treatment guideline by the National Standards Report (2009).

Errorless and Incidental Teaching

Errorless learning is a method that is used to reduce the rate of incorrect responding through providing choices between incrementally difficult stimuli (Mueller & Palkovic, 2007). For example, to teach a child the word "dog," you would first simply present a card with a picture of a dog on it, ask for the student to hand you "dog," and await the correct response. As the student develops, an additional card with a picture of a building could be presented with the hope that the student could still select "dog." The complexity of the task is gradually increased by the number of cards and the similarity to the correct response (i.e. picture of a cat). In this way, the student gradually builds discriminative learning in a relatively errorless fashion.

The example above is only one type of errorless learning where the student gradually builds knowledge. Another type of errorless learning employed by Rethink Autism is known as fading, which begins with a high level of prompting or support that is gradually faded to a lower level over time (MacDuff, Krantz, & McClannahan, 2001). This fading procedure is possibly the most used method of errorless learning, and has the additional benefit of the student always selecting the correct response (Mueller & Palkovic, 2007). When using fading, each trial ends in a correct response because the person administering the trial will progress though a successive sequence of prompts, typically ranging from the lowest level of no prompt to a brief point, then to a full point and finally to a manual prompt in which the student is physically guided to select the correct response. Not every response will be reinforced, but each trial ends in a correct response. The level of prompting begins according to the student's level of independent ability and decreases from that point (e.g. begin with a full physical prompt and progress toward no prompt).

Incidental teaching involves using the natural environment of the child to increase their engagement with the lessons. Although less structured and intensive than DTT, incidental

teaching has been shown to promote high levels of generalization to multiple contexts (McGee, Morrier, & Daly, 1999). It is especially useful for behaviors that do not lend themselves to DTT, such as expressive language and social interactions (Gillett & LeBlanc, 2007). By using incidental teaching, Rethink Autism bolsters the ABA and DTT foundation with instructional strategies that promote student response and generalization.

Video Modeling and Parent Training

Each lesson contained in the Rethink Autism curriculum includes an *in-vivo* video recording of a professional educator delivering the lesson to a child with ASD. The benefits of this video modeling system are threefold: first, the *in-vivo* demonstration allows parents or caregivers to directly observe the appropriate teaching steps and use them as a model; second, because the video depicts real educator/student interactions as opposed to paid actors or cartoons, the audience is more likely to be engaged and subscribe to the video demonstration; and third, the videos provide parents and caregivers insight into how to create and facilitate a positive educational interaction with their child or adolescent.

Video modeling has been shown to produce substantial benefits to the audience, which in this case would be the parents. Specifically, by observing a model successfully perform the behavior, the parents have a much greater understanding of the behavior and a clearer interpretation of how the behavior is to be performed, both of which lead to more successful implementation (Bellini, Akullian & Hopf, 2007). Results from meta-analyses show that video-modeling is an effective intervention and promotes skill acquisition in an efficient manner (Bellini, Akullian & Hopf, 2007).

Rethink Autism contains over 1,500 in-depth videos that explicitly show how each lesson is to be delivered. The value behind these videos is incredible, and the videos are likely to have

a large impact on how reliably the parents deliver the lessons, their engagement in the Rethink curriculum, and their commitment to continue with Rethink Autism. If parents were only given a written lesson plan, it is easy to see how commitment would decrease quickly. In addition, by seeing the positive interactions promoted on each Rethink Autism video, parents may experience some unintended learning of how positive climates can be fostered with their child.

<u>Data Collection, Progress Monitoring, and Decision Points</u>

Although taking very explicit data is a component of ABA and DTT, the methods used by Rethink Autism warranted description in an independent section. Data collection and progress monitoring is critical in any treatment program so that informed and reliable decisions can be made regarding student development. When decisions are made on incomplete or sub-standard data, a number of assumptions become violated and the decision is likely to be problematic. On one hand, if the student has mastered the skill, but the only data suggests they have not, the student would be forced to follow redundant lessons. On the other hand, if a student has not reached mastery, but a single data point was taken when the student correctly guessed, the student may move on prior to actually obtaining the target behavior.

Data collection can be a very burdensome task, especially for individuals who are not familiar with it (Lee, Vostal, Lylo, & Hua, 2011). Rethink Autism has gone to great lengths to make this process as easy and user-friendly as possible. Specifically, each discrete trial can only be recorded as a positive (i.e., successful response) or a negative (i.e., incorrect response). This data is automatically entered into the student's profile and converted into a graph which shows that specific data point as well as all points previously obtained. By converting the numeric data into an illustrated graph, parents and service providers are able to easily see how their student is

progressing throughout the lesson, which has been shown to increase treatment adherence and outcomes (Reinke, Lewis-Palmer, & Martin, 2007).

Functional Behavior Assessment and Behavior Intervention Plans

The basis of a functional behavior assessment (FBA) posits that each behavior serves a particular function; that is, there is a reason that a child emits a behavior in a given context. There are a number of well-documented functions of behavior, including the escape or avoidance of a task or environment, access to tangible reinforcement, access to attention, and self-reinforcing behaviors. In addition to self-reinforcing behaviors, some academicians have also included the need to feel control over one's actions and environment. According to FBA theory, we should be able to identify the function(s) of any behavior based on its consequences.

The use of FBA has rapidly increased over the last few decades (Delfs & Campbell, 2010). In keeping with this, Rethink Autism has included a FBA program that is designed to be easy to use and, over time, can be very beneficial to the parents of children with difficult behavior. Within this program, the data sheet provides space to outline the behavior, the events before the behavior (antecedents), the events after the behavior (consequence) and the hypothesized function of the behavior. The sheet has a number of rows for each behavioral incident which can help discriminate if the behavior occurs in multiple settings for different functions. In addition to the data sheets, Rethink Autism also provides step by step instruction, both in text and video format.

Behavioral intervention plans (BIP) are a common occurrence in our world. These can range from anything as simple as remembering to floss or be as complex as preventing self-injurious head-banging. A BIP is simply glorified language for how we want to make a change in the behavior of ourselves or others. While these are commonplace in the realm of special

education, some parents may not be familiar with the specific components that should be included in a BIP, such as a problem-specific description and data on the problem behavior. BIPs can be written for both problematic behavior and a lack of positive behaviors (Maag & Katsiyannis, 2006). Rethink Autism attempts to bridge this gap by providing the context specific language that can make or break a BIP.

This specific language, combined with results from the FBA, can create an effective BIP for nearly any behavior; however, if the BIP is not showing a decrease in the behavior as measured by Rethink's data tracking, it is very easy to alter the plan in hopes of finding the right combination to reduce problem behavior. Just like a student's progress monitoring for academic skills, behavior data is tracked and converted to an illustrated graph with similar benefits.

Overview

Clearly, each of the components of Rethink Autism has been researched and shown to be effective for behavioral and academic skill development for children with autism. This combination has high face-value, but what has yet to be seen is the differential contribution of each specific component. It may be the case that certain elements are less beneficial and excessive, in which case the program could be reduced to facilitate more time-efficient service delivery; however, until detailed studies are conducted, we are left with the assumption that because Rethink Autism is based on effective and evidence-based interventions and principles, Rethink Autism itself is likely to be effective.

Curriculum

Development

The curriculum of Rethink Autism was developed based on the decades of combined experience from the Scientific Advisory Panel. The curriculum follows developmental

milestones as well as the academic core curriculum, and each component of the curriculum has been broken down to facilitate lesson schedules that adhere to core principles of ABA. The curriculum has been divided into the following areas: Pre-academic; Academic; Expressive Language; Receptive Language; Daily Living Skills; Motor Skills; Play and Leisure; and Social and Emotional.

At this point, most states, including every Western state, have adopted the Common Core State Standards. These standards were developed nationally to provide a clear description of what students of all ages should be expected to learn and master in order to provide each student with the skill set that will promote the highest degree of success for the future. In order to confer the greatest vocational benefit for the majority of the population, these Common Core Standards are primarily academic and include English language arts and mathematics; therefore, the development of each Rethink Autism academic component subsumed by those domains has been guided by the same principles laid out by the Common Core Standards. This alignment between Rethink Autism and the Core Standards serves to provide the greatest gain for all involved parties, including the students, parents and caregivers, and Rethink Autism itself.

As well developed as the Core State Standards may be, individuals with autism will typically require more intensive skill development curricula than just English language arts and mathematics; therefore, the development team and the Scientific Advisory Board at Rethink Autism collaborated to formulate curriculum content that would allow individuals on the autism spectrum to develop functional skills that are similarly imperative for success in future independent, social and vocational settings.

Selection and Individuation

Each component of Rethink Autism's curriculum has been translated into a brief skills inventory. This inventory (described below) provides an initial estimate of the skill set that the child has currently and outlines which lessons should be emphasized in their curriculum to help them achieve their academic, adaptive, social and emotional milestones. This initial curriculum can be further tailored by the treatment team to create an individualized curriculum for every student that focuses on developing relevant skills by building on potential weaknesses and emphasizing student strengths.

The benefit of this protocol is that each individual's curriculum is a combination of assessment-driven recommendations and personally selected lessons based on individual, cultural, and social relevance. The former provides structurally sound methodology for lessons matched to Core or Social Standards, and the latter allows every family, group, or community to personalize the lessons to what is important to the individual(s) with autism at that moment. Additionally, the curriculum is dynamic and can always be revisited, re-assessed, and re-selected as goals and targets evolve.

<u>Pre-academic</u>

The targets of the pre-academic curriculum include skills that prepare students to engage in academic work. Primary skills in this domain include attending, imitation, and matching. The skill of attending is broken down to teaching students first to make eye contact, then wait to begin an activity, and finally to sustain eye contact during conversations. Without this basic skill, it becomes very difficult to promote any reliable engagement in the learning materials from the student. Imitation is built from imitating basic sounds to imitating actions with placeholders, such as blocks. This skill is emphasized due to its value in ensuring the student is both following along and understanding. Matching is taught first by having the student match colors, following

by matching words to words and small objects to objects, then by matching words to objects. The skill of matching is important because it allows silent responding to visual or verbal prompts.

Academic

The Academic Curriculum was developed to meet the Core Standards for English language arts and mathematics. The English components focus upon letter sequencing, spelling, and answering questions, while the mathematics lessons build on counting and simple addition. The lessons attempt to hone real-world skills by utilizing common situations in English language arts and practicing with currency in mathematics. In addition, this curriculum area includes school readiness tasks designed to prepare students for classroom-based behaviors such as joining with groups, raising hands to speak, and completing seatwork independently.

Expressive Language

This domain of Rethink Autism's curriculum aims to develop skills needed to identify objects, use appropriate language and syntax, and produce requests and conversational skills. The ability to identify objects is developed from simple labeling to telling a story, which is a critical oral language skill. Concurrently, grammatical rules and language syntax, such as plural nouns, irregular verbs, prepositions, and verb tense agreement are taught to increase conversational fluidity and semantic awareness. Conversational skills are requisite skills for success in classroom, social, and vocational settings; as such, children in the Rethink Autism program are directly instructed on skills such as asking and responding to questions, delivering a message, and communicating clearly with others.

Receptive Language

The Receptive Language component of Rethink Autism's curriculum places emphasis on identification of objects and actions and following directions. Students' lexicons are gradually

built from familiar objects and people to novel terms and more abstract concepts. Often, these lessons are built around incidental teaching wherein the student may encounter a new word or concept in daily activities which can be assimilated into the Rethink lesson. Following directions is a critical skill for developing students as it predicates successful classroom experiences. In order to access and engage in any social, academic, or vocational setting, we all must be aware of rules and directions as understanding these directions is a basal requirement for compliance. The lessons within this curriculum progress from following single step directions to multiple step directions and include both positive (i.e. do) and negative (i.e. don't) instructions.

Daily Living Skills

In addition to the cognitively based skills thus far discussed, Rethink Autism's curriculum has been developed to include skills that allow individuals to navigate their daily environments. These skills range from household chores and maintenance to taking good care of oneself and practicing appropriate hygiene. Many individuals with ASD do not acquire these skills in the same developmental trajectory as typically developing children and adolescents; thus, it is critical for any program to accommodate the direct and explicit instruction of these tasks. The ability to know when and how to clean an area, prepare snacks, and follow morning or evening schedules will help promote self-care and self-regulation skills that enable individuals to successful engage with their everyday environments.

Motor Skills

The motor skills domain of the Rethink Autism curriculum is divided into fine motor, gross motor, and oral motor lessons. The aim of each area is to prepare the individual for the variety of tasks we face in any given situation. Fine motor skills are critically important in all areas of functioning, including writing, typing, and manipulating objects. The use of interesting

objects that require fine motor discriminations (e.g. ipads) can substantially increase the effectiveness of these lessons. Gross motor skills, such as walking and running, throwing and catching, and imitating calisthenics can have a phenomenal impact on student development and socialization. Not only are there health benefits of engaging gross motor activities, there has been shown to be myriad physical and cognitive benefits from kinesthetic motion. Finally, oral motor skills are emphasized in this domain as they allow individuals to communicate effectively and engage in real-world activities such as drinking from straws and blowing bubbles. While these skills may not be ultimately critical for academic and vocational success, they promote valuable secondary benefits and provide the students with an enjoyable connection to the curriculum.

Play and Leisure

Play and Leisure activities are invaluable in helping all individuals reduce stress and enter into a more positive frame of mind. Individuals with autism are no different, and helping them learn strategies that are relaxing and soothing can make the difference between a frustrated yet manageable reaction and a complete tantrum and breakdown. These skills are taught through individual play, group play, and pretend play. These lessons are created to be highly reinforcing and engaging, but also provide ample opportunity for incidental teaching of social interaction skills, empathy and recognizing emotions, and stress management skills.

Social and Emotional

Although these skills are interwoven among many other elements of the curriculum, their importance in our level of adaptive functioning warrants individually devoted lessons. The targets of these curriculum elements include joint attention, reciprocal communication, cooperating with others, and tolerating uncomfortable situations. Along with the other functional

elements of the curriculum, these domains rely heavily upon individual experiences, strengths, and limitations. For example, a lesson from Rethink Autism may be entitled 'Preparing for a Haircut;' however, if the individual is okay with haircuts but has an intense anxiety surrounding doctor visits, the lesson can be modified to tailor to the individual's needs and goals. Lessons emphasizing joint attention are particularly apropos for this population as this social skill has been found to be predictive of the most beneficial outcomes in numerous early intervention studies.

Implementation

Registration and Profile

Each individual with autism who will be engaging in the Rethink Autism program must be registered and committed to the service. This is easily navigated through Rethink Autism's web interface. Following registration, each individual must create a profile which includes information such as name, age, grade, gender, siblings, educational classification or diagnosis, verbal ability, interests, and primary areas of concern.

Skills Assessment

Once the registration process is complete and the individual has a profile, a brief skills assessment is administered to determine areas of strength, weakness, and priority. This assessment is a 38 item questionnaire in which each item represents a behavior, ability, or skill that is directly related to the Rethink Autism curriculum. For each of these items, a parent, caregiver, or professional rates the child on a 3-option scale ranging from 'Hardly Ever' to 'Sometimes' to 'Regularly.'

These responses are scored automatically and a report is immediately generated. Based on this assessment, Rethink Autism identifies specifically customized curriculum lessons that are

considered most imperative given the chronological age and developmental stage of the individual with autism. As previously mentioned, though, this customized curriculum course is amenable to any changes that parents or caregivers see fit. That is, if a desired lesson or goal is not listed on the generated curriculum, individuals may substitute it for a lesson that is not highly valued at that point in time. The curriculum generated by Rethink Autism is simply a tool to help get individuals started, and is easily modified or updated at any time.

Team Members

Rethink Autism is aware of the benefits of having a multi-person and multidisciplinary treatment team for every individual on the autism spectrum. For this reason, they have included the option to add various team members to each persons Rethink Autism program. These added team members could include anyone who may be invested in treatment delivery or evaluation, such as behavioral consultants, family members, physicians, school psychologists, teachers , special educators, and babysitters.

There are a number of features available to all members of the team, regardless of their level of participation in treatment. Rethink Autism provides a calendar, planning sessions, and easy ways to communicate between team members. This can be especially useful if the team members have limited face to face contact with each other; moreover, every team member has access to the data management and progress monitoring system which can inform and facilitate decisions related to weekly goals, expectations, and even IEP development.

Lesson Delivery

Rethink Autism has enhanced video-recording of each lesson. This allows the parent or caregiver is able to directly observe the steps, and the enhanced content provides helpful hints and breakdown menus during the video playback. This combination of video modeling, content

checklists, and embedded troubleshooting techniques enable the service provider to deliver the lesson effectively and comprehensively.

Each lesson focuses on teaching a specific skill, and through a process called task analysis, these skills have been broken down into small, discrete steps. By breaking larger and more complex skills into smaller, simple tasks, the teacher is able to provide more specific instruction that lends itself to errorless training and more reliable treatment gains.

Breaking down the steps of a complex skill or performance into small tasks provides a number of benefits in addition to errorless teaching. Specifically, with smaller tasks, there is more opportunity to build confidence and self-efficacy for both the student and the teacher. With increased self-efficacy, the student will be more engaged, confident, and excited to participate in the program. For the parent or teacher, increased success and self-efficacy will help maintain a positive teaching atmosphere and reduce likelihood of burnout.

Research has consistently shown that a primary concern with any newly acquired behavior is the lack of generalization to other contexts; that is, while a student is able to learn myriad skills in the structured classroom, these same skills are simply not transferred or generalized into other environments such as the playground, family room, dinner table, or in social settings outside the home. To attempt to facilitate generalization, Rethink Autism has included in every lesson helpful hints of how you can elicit the skills or behaviors from the lesson in real-world situations.

Within the Rethink Autism user platform, the home screen displays all lessons that are currently a part of the individual's curriculum. These lessons can be ranked in order of their priority, and will automatically generate lesson sequences. Whenever the individual and service

provider (parent, teacher) are ready to begin, a lesson is simply chosen and loaded on the person's home computer.

Lesson Structure

Each lesson follows a similar structure to provide children with a very predictable routine. The lesson format begins with the curriculum domain, lesson title, and objective. The objective is worded in a concise manner to maintain clarity for the desired outcome of the lesson. In this way, no single lesson can become too burdensome or unmanageable, and if a student is having a particularly difficult time, the lesson objective can be easily translated into other treatment programs. Directly following the objective, each Rethink Autism lesson includes any supplies that may be necessary to deliver the lesson.

The structure of teaching the lesson typically includes multiple steps that gradually increase in difficulty. The difficulty could be increased based on complexity (counting with only dimes→ counting with all coins), duration (attending for 3 seconds→ attending for 60 seconds), and environment (following instruction with no distraction→ following instruction during preferred activity). These teaching steps are modeled and described explicitly with direct instructions as to what needs to be done to make it simple and straightforward for anyone to follow. There are multiple examples given, as well as ways that generalization can be promoted by varying the task and setting. In order to deliver the maximum likelihood of success, each lesson also includes guidance for error correction and prompting.

In addition to the explicit direction and video modeling, each lesson provides various troubleshooting and helpful hints that provide assistance for frequently occurring problems. Finally, there is a specific IEP component which re-states the objective in goal-oriented language and breaks this goal into number short-term objectives. In this way, if a student is having

difficulty with any specific component, it can be shared across multiple treatment settings to facilitate communication between service providers and promote student skill acquisition.

Data Tracking and Progress Monitoring

There is great value in adhering to structured and comprehensive data collection as it allows objective measurement of a student's progress and provides direct empirical evidence for decision making procedures; however, keeping reliable data can be very difficult, especially for parents, caregivers and teachers who have not had any formal training in data collection or data management. For this reason, Rethink Autism has developed a very straightforward system in which most individuals will be able to comprehend and complete data tracking for any individual's behavior. For those who still have trouble, there is a link embedded in the sidebar that provides detailed instruction.

This tracking system is universal across the curriculum and includes very basic information that is programmed automatically by Rethink Autism's platform. Namely, each lesson is prepared to include the student's name, date, time, and brief descriptions of the lesson objectives. The user simply fills in their initials, marks if the behavior or skill was demonstrated correctly or incorrectly, and makes any notes that are warranted. Trials are given in blocks of 5, not to exceed 2 blocks, or 10 trials, at any one time. All data entered is saved on Rethink Autism's server, and is translated into a graph that all team members can view. This visual representation of the data has been shown to increase providers' understanding of treatment, as well as treatment engagement and fidelity.

Decision Making Points (Mastery Goals)

Once a student appears able to consistently respond correctly, and at least one day has passed since first teaching the lesson, mastery testing is recommended. In this process, the

student is not reminded of or retaught the lesson; that is, the parent, teacher or caregiver simply gives the same instructions without prompts or assistance. The data input procedure is the same as that outlined above.

To reach mastery, a student must achieve 90% correct responses. If a student achieves 100% on the first block (5 trials), the session is ended and then resumed no sooner than three hours later to prevent any practice or carryover effects. If, after three hours, the student completes another block with 100% accuracy, the student is considered to have achieved mastery. If the student misses one trail on the first block (4/5), they are immediately administered a subsequent block. If they complete that block with 100% accuracy, they have achieved 90% overall on both blocks. If this is reached, the procedure follows the method described above. If a student responds with below 90% accuracy over 10 trials, the testing session is discontinued and the lesson or skill is re-taught.

Functional Behavior Assessment and Behavior Intervention Plans

The goal of Rethink Autism is to provide treatment for individuals with autism in all areas of functioning. To do so, components are included which are designed to address behavioral concerns as well as academic skills and abilities. For this service, Rethink Autism relies on FBAs, in which the individual's behavior is closely observed and recorded in a structured, objective manner.

Rethink Autism provides FBA forms in which a parent, teacher, or caregiver records the ABC's of each occurrence of a problem behavior. Upon this form, data is taken on the date and time of the occurrence, as well as the context or activity. There is space to record the Antecedent, or what occurred before the behavior, the Behavior described in objective and specific terms, and the Consequence, or what occurred after the behavior. Finally, there is a

column for the user to make an educated estimate as to what function the behavior served, or why they believe the behavior occurred. This is based off the four primary functions of behavior, but there is also a space for the user to write in "Other."

With good reason, the form includes space for the recording of multiple behavior occurrences. Human behavior is incredibly complex, and the primary function of any one behavior may vary from time to time depending on the context, available objects or activities, other people present, or any host of state-based motivational issues. Best practice dictates that the most reliable FBA's are those with data collected from multiple contexts and over a reasonable amount of time.

Rethink Autism Resources

Educational Resources

Rethink Autism's website includes a plethora of educational tools and resources that can be very helpful to parents and caregivers trying to navigate the world of autism. These tools range from diagnostic tools (such as a basic overview of autism, early signs and the diagnostic process) to treatment components (including types of treatment, a detailed description of ABA, and resources that may be helpful).

In addition, Rethink Autism provides links to new research in autism and reports generated from the Center for Disease Control (CDC). These reports allow users who would like to acquire a more academic knowledge base to access and peruse empirical literature. Rethink Autism also provides a Selected References file that enables users to independently research many of the original source articles that Rethink Autism is based upon.

Finally, Rethink Autism provides information to parents about the school system and the process of having a child receive the educational diagnosis of Autism, what an IEP looks like,

and how to advocate for the most effective special education services. In a similar vein, Rethink Autism provides subscribers access to the IEP builder. This tool transforms all current lessons that the student is working on into appropriately phrased goals that can be directly applied to their IEP. This tool is available for both academic skills (e.g. Johnny will read 2 pages per 15 minutes with 80% accuracy) as well as behavioral skills (e.g. Johnny will keep his shoes on for 5 minutes during instructional time). The value of this tool cannot be understated, especially for parents who are less familiar with IEP's and the special education process.

Community Resources

In addition to the educational resources mentioned above, Rethink Autism also provides a number of community-based resources that may be very helpful to parents and caregivers. Parents can join mailing lists in which Rethink Autism will send out the 'Tip of the Week.' These tips are often taken from the direct experiences of parents who have found solutions to various challenging behaviors and problems. For example, one tip focused on how to help children with autism have a successful visit to the dentist or doctor (a task that is much easier than it sounds). These tips come from years of practice-based evidence and provide strategies that are immediately useful.

Another useful component of Rethink Autism's community resources is a Q and A in which any member can ask a question and the Rethink Autism community can respond. This process is not necessarily empirically-based, but it allows parents to get answers to highly individualized problems without having to sift through hundreds of Google results. To parents and professionals, this level of peer support may feel like a life-saving network that responses to any questions regardless of the level of difficulty.

Rethink Autism also has a series of Webinars delivered by members of the scientific panel and other professionals and experts in the field of autism. These webinars cover a range of topics, and each one has been archived so that anyone may search through and watch them. Also, Rethink Autism provides information regarding upcoming seminars, including dates, locations, and topics that will be presented at conferences or as standalone seminars. For parents who prefer to learn about Rethink Autism directly from a service provider or regional representative, these seminars offer a great opportunity to see hands-on use of the Rethink platform.

<div align="center">Evaluation of Rethink Autism</div>

Applications

Naturally, the three different programs (personal, organizational, and BCBA supervision) each lend themselves to different realms of applications. The personal Rethink Autism is ideal for single families to provide the most effective services to their sons and daughters, and the team member component allows the student's profile and progress to be shared easily amongst teachers, nannies, and other service providers. The organization application of Rethink Autism is ideal for school psychologists and special educators who have multiple students with ASD. The ability to easily record and monitor each student's progress within the same platform adds a much needed level of efficiency to the daily schedule of any service provider.

The supervision function of Rethink is of great benefit for anyone hoping to receive BCBA supervision. The primary benefit of this application is that a student who wishes to become BCBA certified is able to accrue hours of supervision while delivering the ABA-based Rethink Autism program. Finally, the educational and community resources are ideal ways to increase the level of knowledge and support given to parents and caregivers. For many families,

having a child with autism is an incredibly confusing and difficult experience. Rethink Autism's easily accessible knowledge bank and abundant peer-support resources can make a big difference for any parent, caregiver, or service provider.

Benefits

Rethink Autism is touted as being simple, effective, affordable, accessible, and immediate. The Leadership and Development Team behind Rethink Autism has gone to great lengths to make the content very user-friendly and intuitive, with built in features that explain or provide support for any questions that arise. Next, based on research reviews and input from the Scientific Advisory Board, Rethink Autism includes only empirically supported interventions and teaching strategies. Primarily, the most effective intervention for the majority of individuals with ASD is early and intensive ABA, which includes discrete trial teaching, cueing, prompting, shaping, fading, and generalization. These methods are constantly under revision and refinement to ensure that only the most supported interventions are promoted.

It is clear that having the most supported and recent methods will produce the most reliable treatment gains; however, the continuous evaluation and development of these methods is often very costly. Rethink Autism is considered an affordable treatment option because Rethink allows an extensive amount of background research and development to be accessible to every subscriber thereby increasing the cost-effectiveness for both Rethink Autism and the consumer. Rethink Autism is also cost-effective when compared to other services offered. For example, in the state of Utah, a 2-day parent training in ABA can cost upwards of $1,200.00, and bi-weekly consultation from a BCBA has been estimated at $480.00 per month (Cardinal, 2011; Utah Parent Center, 2013). Compared to less than $100.00 per month per child, Rethink Autism is clearly an affordable solution for families seeking ABA-based treatment.

The digital nature of Rethink Autism is also a great benefit. Because it uses a web-based platform, Rethink Autism can be accessed from anywhere with an internet connection and at any time that is convenient to the parent, family, or community. This can be especially beneficial for families in rural settings who may not have access to ABA services or whose access may be limited. Finally, in Rethink Autism, each child's parents are directly involved in the treatment program. Too often parents are not active in their child's treatment, but here the parents can become the therapists, taking control of the lessons and content and, hopefully, learning skills that will generalize beyond the Rethink Autism program.

Awards and Testimonials

There is ample anecdotal evidence that supports Rethink Autism's model. Since large scale research trials have not yet been published, this type of evidence is helpful in demonstrating the benefits of Rethink without having to wait for the typically longer turn-around of empirical articles. Namely, Rethink Autism has won the Software and Information Industry Association (SIIA) CODiE award in 2011 as well as in 2012 for being the Best Instructional Solution for a Special-needs Population. These awards are given to computer based programs which are nominated by SIIA members, nonprofit organizations, and the general public. An extensive judging sequence then determines which nominations have demonstrated the greatest utility or benefit.

Other sources of anecdotal evidence come from the testimonials presented from parents, caregivers, and service providers. These testimonials are available for review directly on Rethink Autism's website, on the blog, and throughout other web-based sources as well. Positive feedback regarding the program is presented from a variety of disciplines, including

school psychologists, case managers, special educators, teachers, parents, and even the children with autism themselves.

<u>Dissertation Support</u>

In 2011, Jennifer Cardinal completed her dissertation titled: *"Rethink Autism": Effectiveness of web-based applied behavior video modeling program on the performance of paraeducators and students with autism spectrum disorder* (Cardinal, 2011). This dissertation focused on the training of paraeducators in the state of Utah using the Rethink Autism program. Each paraeducator (*n*=4) was matched to a student with ASD in a special education classroom, where ABA and DTT skills were taught and evaluated.

While this dissertation included some student outcomes and a cost-of-services analysis, the primary outcome measure was the paraeducator's knowledge of DTT. Rethink Autism provided an initially satisfactory training tool for many of the DTT skills that were targets of investigation; however, during a re-training procedure the researcher added additional DTT training videos from Rethink and corrective verbal feedback to enhance each DTT lesson (Cardinal, 2011).

The primary results of this dissertation were that paraeducators could be trained in DTT skills using the Rethink Autism platform with minimal supportive supervision in the form of corrective verbal feedback. This was demonstrated by robust effect sizes (average = 3.28) for each of the paraeducators DTT skill level as measured by the primary outcome data source, the DTT Skills Evaluation form (Cardinal, 2011). Further, this study revealed that each child with autism made some gain in skill development from baseline, although this finding is slightly limited by the relatively small amount of data collected regarding skill acquisition. With regard to her third aim, Cardinal (2011) found that training paraeducators, as opposed to special

educators, was highly cost effective. Special educators typically have a high number of demands placed upon them, and the training of paraeductors in the same principles would be ideal so long as the training is effective. The paraeducators were able to learn the skills behind DTT in a highly effective and efficient manner, with a cost of less than half of what would be required to conduct the same training with special education teachers (Cardinal, 2011).

National Standards of Treatment

In 2009, a committee was formed that aimed to investigate the scientific literature regarding treatments for children with autism. This committee, the National Standards Project, evaluated all current practices in autism treatment with the overarching aim of rating the scientific merit, quality or strength of evidence, and applicability of each intervention. This comprehensive study was the first of its kind in the identification of current intervention practices (NAC, 2009).

These interventions were delineated into four groups: Established; Emerging; and Ineffective or potentially harmful. One critical intervention included in the Established category was ABA and behavioral treatment strategies. This finding goes to support the use of ABA and DTT from an unbiased and comprehensive report. Also included in the Established category were video modeling, other modeling strategies, and naturalistic, or incidental, teaching. Of the Rethink Autism components falling into the Emerging category were structured teaching and technology-based teaching. This is not to say that these techniques do not work, they simply did not meet the requirements for Established. Of note, the only component of Rethink Autism that could be considered to fall into the Ineffective category was academic interventions; however, despite the academic elements of Rethink it is clearly more focused on the behavioral strategies.

This evidence supports the use of Rethink Autism in that most components align with either the Established or Emerging Standards. As our society becomes increasingly web-based, it will be important for programs to adapt and develop programming that is technology based. Therefore, the Emerging ranking should be viewed not as a slight, but more as Rethink Autism having room to improve and be positioned on the forefront of web-based interventions.

Barriers to Implementation

There are a number of potential hurdles in the implementation of Rethink Autism. These include understanding and using the Rethink curriculum, misuse of materials, and specific parent or child variables.

Barriers to implementation from parent variables could include attrition and lack of motivation. For example, they could be focused on teaching a lesson that is highly valued but beyond the current skill level of their child. This may result in failure to acquire the new skill, but instead of returning to an earlier skill some parents may belabor the lesson, which can cause frustration and lead to giving up. Another family-based variable that could render Rethink Autism less effective is if the curriculum is not aligned with the cultural or moral values of the parents.

Another barrier to Rethink Autism includes the misuse of materials. This could occur in a number of ways, but the primary concern is that the parent or service provider may use the materials in a modified manner that is not endorsed by Rethink. Making adaptations is often necessary in treatment paradigms, but to do so using Rethink materials could present a confounding variable in appropriate service delivery.

The final and perhaps most common barrier to Rethink Autism implementation is the level of understanding parents, caregivers, and service providers have for the facets of Rethink.

Namely, ABA can be very overwhelming, and a poor understanding of the principles of behavior can substantially limit effective delivery of Rethink Autism. The enhanced video and explicit instructions help with this, but there is still a large margin for potential error in ABA delivery. Additionally, while Rethink has gone to great lengths to facilitate data recording and progress monitoring, these domains may not be intuitive to some parents. If any element in the data tracking procedure is not well understood, there could be a cascading effect that limits the utility of the data, upon which the adaptive decision points are made. Therefore, the potential effect of a parent not fully understanding data collection would be a substantial barrier to effective implementation of Rethink Autism.

Limitations and Future Research

The primary limitation of Rethink Autism is that there is no published, empirical study that demonstrates the effectiveness of Rethink over a control group or alternative services. This research would be invaluable in demonstrating how the combination of evidence-based approaches in Rethink Autism contributes to beneficial treatment outcomes. Even with such a study, it would be difficult to determine if certain components were differentially effective; however, it would be a start in the right direction.

Other limitations of Rethink Autism include the rigid structure behind each lesson and potential variability of the lessons. Although this structure could be touted as a benefit, it can also become a limiting factor if a parent or service provider is unable to follow the lesson or needs to make any modifications. Making modifications by itself is another limitation, but it seems unlikely that the ideal lesson will work for every individual subscriber. Moreover, because some of the 1200 enhanced video lessons were in the process of being created concurrently with the Rethink Autism platform, it is possible they may not adhere to the same

explicit steps. These areas of concern will become elucidated with more research and practice-based evidence.

Additional research into the application of Rethink Autism in rural as compared to urban areas would also be useful. Anecdotal evidence and intuition would lead us to believe that services are more limited in rural areas. Research investigating this claim as well as how Rethink Autism can help provide much needed services in rural areas is highly needed; moreover, if found, support for Rethink Autism in rural school districts would provide a base upon which federal grants could be written to use Rethink in multiple settings at no cost to the parents or schools.

Finally, more research into individual differences in response to Rethink Autism is needed to make discriminations regarding who will benefit most and who may not gain much from the Rethink platform. These differences should be evaluated in terms of age, educational background, cognitive ability, adaptive functioning, severity of autism, and any comorbid diagnoses that may interact with treatment. It is possible that Rethink Autism is more effective for one range of individuals and less effective for another. Additionally, parent characteristics should be evaluated as well, including many of the above variables as well as employment, other treatments they have tried, and familiarity with ABA. Those parents who have more time devoted to Rethink Autism may show higher rates of fidelity, and those with a more extensive background in ABA would likely adapt to the curriculum more quickly.

A Model of Implementation: Rethink.U

Overview

It has been suggested by Rethink Autism that the most effective use of its program includes consistent supervision from individuals with training in behavior analysis. While

ideally this would be a Board Certified Behavioral Analyst (BCBA), the cost of such a service has been demonstrably over-burdening; however, another resource can be found in graduate students whom have taken multiple courses related to ABA, autism intervention, and methods of effective instruction. Some graduate programs that would be apt for this endeavor are behavior analysis, educational psychology, school psychology, and special education. Graduate students may be an ideal fit for consultation-based supervision of Rethink Autism given a relatively flexible schedule, involvement in federally or state-funded grants, and access to materials and resources regarding effective intervention and ABA strategies.

Rethink.U

In Salt Lake City and surrounding areas, there are often long waiting lists for ABA-based treatment programs, leaving families with few options to provide evidence based practices with individualized attention to their children in need; moreover, those families living in rural areas may not have equal access or even awareness of such specialized programs. Graduate students in the Department of Educational Psychology at the University of Utah are committed to providing valuable clinical services to the community. School Psychology graduate students receive extensive training in ABA techniques, FBA and BIPs, direct instruction, evidence-based practice, and client-centered consultation.

While graduate students are well-trained in these various methods, there is limited exposure to real-world application of these skills until relatively late in the program sequence. Opportunities to use these skills in a structured and supervised manner would provide graduate students ample practice-based experience to supplement their learning in the classroom. We propose that an ideal partnership between these graduate students and families using the Rethink Autism program would be maximally beneficial for both involved parties. This program is

designed to take place over 6 stages: recruitment and buy-in; pre-service training; lesson implementation; in-service booster training; lesson implementation; and out-service evaluations.

Recruitment

Graduate student scheduling and funding cycles tend to be highly structured; as such, we have opted to forgo general advertising strategies and snowball sampling methods as they typically result in low but steady rates of recruitment. Instead, we propose to use targeted recruitment in order to obtain a relatively large sample in a very rapid, albeit punctuated, timeframe. Through existing collaborations between the Department of Education Psychology and various healthcare providers in Salt Lake, Utah and Davis counties, we will be able to promote this program by targeting families currently waiting for ABA-based treatment for their child or children with ASD. There are several inherent biases and threats to internal validity via this sampling process; however, we have deemed it to be the most accessible and time-effective method to begin this pilot program. With that said, there is no reason this process cannot be modified in subsequent cohorts.

Participant Buy-in

Participants who have established a greater commitment to treatment programs have been shown to have higher levels of engagement and adherence, greater willingness to try new tasks, and generally more successful treatment outcomes. As such, participant buy-in is viewed as critically important in our proposed model. We require participants who must be willing to: 1) take a substantial amount of time to learn the Rethink Autism model; 2) spend sufficient time to become familiar with Rethink Autisms website interface; 3) access Skype or similar video communication software for bi-weekly consultation with graduate students; 4) ask graduate students candid and potentially difficult questions; and 5) work very diligently. ABA is

exhausting, and the above commitments should not be taken lightly. The more closely these requirements are adhered to, the more likely the outcomes and experiences of this program will be successful.

Graduate students and the Department of Educational Psychology must also make substantial commitments and buy-in to the Rethink.U program. As graduate student consultants, we must be accessible, approachable, and optimistic. The more we embody these traits, the more the family will enter and establish into a consultative relationship. We will need to work just as diligently as the parents, perhaps even more so during the initial stages of the process. It is easy to forget that we are unique in our knowledge and have received highly specialized training in principles that may not be intuitive to the families we will serve.

Ultimately, in spite of the training we have thus far received, we will require supervision and oversight from the Department of Educational Psychology. This will need to be both scheduled to recur on a regular basis and at intermittent times throughout the program as ambiguous or potentially serious issues arise that require supervision. Finally, although graduate students have a prototypically low income, there must be some compensation for these efforts. Currently, this support is provided through a grant from the United States Office of Education that funds a number of graduate student initiatives, with the Rethink.U program being one component.

Pre-service Training

Families are more likely to subscribe to Rethink Autism if they are able to understand and navigate the program effectively. For this reason, we propose a pre-service training day in which the families and their children come to the University of Utah computer labs. The purpose of the parent session will twofold: first, we will spend the morning providing an overview of

behavioral theory and the ABA model of instruction; second, the afternoon will be spent

assisting parents with registration and setting up an account with Rethink Autism.

Each graduate student involved will participate in either the ABA seminar or the Rethink

Autism seminar. During the time that they not in seminar with the parents, the graduate students

will be running games or activities with the children to get to know them better and provide

parents with a brief respite. The goal of these activities is to foster a highly positive environment

for the children and to establish good relationships between the parents and graduate students.

Parents will also be encouraged to bring any records, evaluations, or documents that provide

relevant detail as to student diagnostics, services received, and treatment planning. At the end of

this pre-service session, graduate-family dyads will be formed that will continue through the

programs completion. Once these dyads are formed, a brief interview will follow in which

questions can be answered and baseline assessments will be administered.

<u>Lesson Delivery</u>

Following the pre-service training, parents will begin to implement their child's

curriculum and lessons. During this time, they will have regularly scheduled contact with their

graduate student via Skype, email, and over the phone. These sessions will occur whenever they

are needed, but never less than a minimum of once per week. Ideally, these consultations

sessions will be beneficial to the families in terms of direct support for questions or difficulties as

well as to the students in providing them with valuable consultative experience to prepare them

for future practice.

The consultation will be child-centered and parent-driven; that is, the focus is to provide

the most effective service to the child that is attainable through the parents. All consultations

should begin with the parents providing a brief overview of what lessons have been in practice,

how those lessons are going, and what impact they are seeing in their child. All issues should be directed by the parents to maintain a positive consultative role and reduce the likelihood that parents view the consultant as overbearing or unrealistic.

Because the consultant will be listed on the child's Rethink team, data collection should be monitored and any notes should be reviewed prior to the consultation. The data uploaded onto the Rethink platform will serve as an excellent base upon which to build progress monitoring, and the consultative sessions should also be supplemented with any anecdotal data that is not readily uploaded into Rethink Autism. Special focus should be directed to any attempts to generalize behaviors to other settings, including both successes and failures. By collecting this data during consultation, we may begin to observe patterns revealing which behaviors lend themselves to generalization and which do not.

As a supplement to the weekly consultations, graduate students should meet with the family at least once per month. This in person meeting will provide a more tangible connection among the dyad as well as an opportunity to observe the strategies and methods used by the parent or caretaker. Should any particular aspect of ABA or Rethink Autism be found in need of remediation, this face to face interaction would allow the parents to directly observe the graduate student delivering the instruction in the appropriate format.

<u>In-Service Troubleshooting</u>

At nearly the middle of the treatment semester, the whole cohort will regroup for a "booster" session in which all dyads will refresh their knowledge of DTT and ABA instruction. The goal of the "booster" session is to maximize the effectiveness of the Rethink Autism curriculum. This session will also provide an efficient meeting between the dyads and the faculty responsible for the oversight of the project allowing the faculty to ensure that the parents

are satisfied with ABA treatment.   Also, the faculty will be able to evaluate the skill development in each of the children.

The in-service will provide an excellent opportunity for parents to share with other parents what has been working well for them, what hurdles they have encountered, and what strategies they could use to try to increase generalization. Allowing this parent-parent support network to develop will have multiple benefits, including fostering a positive appraisal of the program, normalizing the experiences, and potentially assisting parents in accepting and looking past some to the difficulties and frustrations they may be experiencing.

Finally, another primary function of this in-service training is for the investigators to collect data regarding the Rethink.U program acceptability, implementation, and integrity. This data will be highly valuable in determining how consistently the program is being used and any strategies that would help increase the fidelity of Rethink.U. By learning and understanding the barriers to effective implementation, the Rethink.U program can be modified and improved to mitigate these barriers in future cohorts.

Out-service

After the in-service, families and dyads will resume their Rethink.U programs for the remainder of the treatment semester, adhering to all components previously described. At the conclusion of the semester, all dyads will reconvene one final time to provide a formal post-evaluation of the effects of Rethink.U. This out-service will serve as a final observation of each child's skills and behaviors, as well as parents awareness of ABA principles.

Various quantitative outcome data collected will include stages of skill acquisition and development, skill generalization, and gains within the Rethink.U program. Treatment integrity, effectiveness, and acceptability measures will also be recorded to evaluate program logistics,

both to determine what went well and what can be improved upon. Anecdotal data will also be collected regarding how parents viewed the lesson plans and curriculum with notations on any potential adaptations to these components.

The evaluations will not be limited to the parents; data will also be collected regarding the consultative experiences. Graduate students will be asked to provide input on perceived consultation effectiveness, barriers to effective consultation, general strategies and methods employed to foster an effective consultation relationship, and specific areas of success or frustration. Parents will provide feedback on similar variables, as well as how the consultation experience could be enhanced.

Finally, the faculty will also evaluate all aspects of service delivery and the adherence to evidence based practice. While their role as supervisors throughout the program will be to provide complete oversight, this out-service will allow them to experience much more involvement with the treatment dyads and take more direct approach to the Rethink.U program evaluation. The faculty will be faced with the ultimate decisions regarding the overall cost-benefit evaluation of this program and whether to continue, adapt, or dismiss this treatment program.

Having the group meet one final time will also provide a feeling of closure, although parents will be encouraged network or exchange numbers as they see fit. The families will no longer receive the Rethink Autism services free of charge, nor the graduate student support, so it will be interesting to see if any families opt to continue the Rethink program out of pocket.

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