# USE OF SCHOOL-BASED ONE-TO-ONE AIDES FOR CHILDREN FOLLOWING TRAUMATIC BRAIN INJURY: A PROPOSED PRACTICE MODEL

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## ABSTRACT

*One-to-one aides can be an important intervention resource for the reintegration of children into school following traumatic brain injury (TBI). School-based one-to-one aides are typically paraprofessionals assigned to monitor children with TBI throughout the school day. This intervention allows for a continuous feedback and reinforcement schedule to address problematic behavior. Potential drawbacks of this resource, however, include cost, role confusion, and increased dependence upon the one-to-one aide to maintain classroom functioning. Intervention models and goal-planning strategies are needed to help ensure that one-to-one aides intervene in a cost-effective, time-limited manner that contribute to the reacquisition of functional classroom skills as well as a decreased reliance upon the one-to-one aide for behavioral control. We present a model for conceptualizing the use of one-to-one aides in the classroom, and discuss intervention strategies to address common problems observed in children following TBI. This model is*

*based upon our combined experience in school reentry following TBI as well as a current understanding of executive functioning, with an emphasis on addressing potential needs in behavioral regulation and goal-directed action. Additionally, general guidelines for the utilization of one-to-one aide in the classroom are proposed.*

Many children and adolescents recovering from traumatic brain injury (TBI) struggle with re-entry into the school system due to difficulties with attention, concentration, memory, language, motor skills, personality changes, and/or somatic ailments (Telzrow, 1990). Given the wide variability in TBI severity and associated functional limitations, it has been recommended that school re-entry programs combine services and supports that are individualized and flexible (Feeney & Ylvisaker, 2003). While flexible educational approaches are more readily available in special education classrooms, the specific learning needs of children following TBI are not appropriately addressed by approaches designed for children characterized as mentally retarded, learning disabled, and/or emotionally disturbed (Savage, 1987; Savage, ). Inappropriate placement of children with TBI in such classrooms may further complicate existing learning and behavior problems. Placement of students with TBI in regular education classrooms, however, is also problematic. The needs of such students for educational and instructional modifications often extend beyond those typically offered in the regular education setting. One potentially useful component of an individualized and flexible re-entry program is the inclusion of a one-to-one aide to assist children with TBI in their transition back into their educational settings.

School reentry represents a component of the TBI rehabilitation continuum for children. The one-to-one aide can be viewed as an important resource in facilitating school reentry, particularly when the ongoing academic rehabilitation needs of the student extend beyond the practical time and resource capabilities of the regular education classroom. While rehabilitation is not commonly considered the primary goal of the educational environment, ongoing rehabilitation approaches are thought to be necessary for some children with TBI to develop greater independence, behavioral control, and academic competence. The establishment of an environment that is positive, consistent, and focused upon assisting children develop strategies for learning is considered to be central to such academic rehabilitation approaches, especially as instruction is progressively generalized to real-world settings (Ylvisaker & Feeney, 1998). Other academic rehabilitation components include temporary assistance in goal planning and behavior regulation

(Szekeres & Meserve, 1998) as well as responsive scaffolding or cognitive coaching to assist these children in learning skills required for successful academic reintegration. Within this academic rehabilitation framework, we conceptualize the role of a one-to-one aide as a time-limited resource designed to teach skills and to help students adjust to the demands of an appropriate educational setting as their level of functioning stabilizes.

Unfortunately, there are few accepted guidelines regarding the assignment and use of this type of intervention service with children who have experienced TBI. The implementation of one-to-one aide services often occurs without clearly defined goals or intervention strategies. To examine current practices regarding the use of one-to-one aides for the brain-injured pediatric population, we contacted educational officials in the state of Maryland and found limited and often contradictory guidelines for the assignment and use of one-to-one aides. In our dialogue with these educational officials, the use of one-to-one aides was frequently described as an intervention strategy fraught with problems. Frequently mentioned pitfalls included conflicts between teachers and aides, teacher over-reliance on the aide for instruction, development of dependence upon the one-to-one aide for behavioral management, and prohibitive costs. In practice, the majority of one-to-one intervention services provided to Maryland's elementary, middle, and high school students with TBI were assigned well after their initial school reentry. Moreover, one-to-one services were described as being considered and used only after less intensive measures had proven ineffective, once the behavioral/educational maladjustment of the student had become clearly evident, and once these difficulties had put the student's academic placement in jeopardy.

A review of the literature in the fields of education, psychology and brain injury revealed few studies formally investigating the conceptualization, implementation and efficacy of school-based one-to-one services or instruction for children with TBI. Published guidelines for the role and intervention practice of one-to-one aides in schools do exist, but generally are developed for other clinical populations, and comprehensive models and efficacy studies are still lacking. Individualized interventions utilizing a one-to-one student/adult ratio are periodically used with children diagnosed with autism and related disabilities in inclusion classroom settings to help accommodate for communication deficits, behavioral problems, difficulties with transitions, and generalized safety concerns. As commonly utilized with this clinical population, a one-to-one aide is typically not an instructor but rather a paraprofessional who is asked to fulfill many duties including safe transportation of the child, implementation or facilitation of school based medical needs, assis-

tance with communication, keeping the child on task during instruction, encouraging the child to maintain appropriate social behavior, and assistance with the implementation of behavioral and academic goals in general.

While one-to-one aides are often used with children diagnosed with autism, there is limited published information regarding the conceptualization, implementation and efficacy of such services with this population, particularly when services are implemented in inclusion rather than self-contained (e.g., Applied Behavior Analysis) classrooms. The majority of existing literature in this area consists primarily of proposed guidelines rather than empirically supported programs. An example of such guidelines are those proposed by Freschi (1999) for the use of one-to-one aides with children diagnosed with pervasive developmental disorders. These guidelines emphasize the following: conceptualizing the teacher as educational leader, collaboration and communication between the teacher and the aide, and an understanding that the aide serves a temporary, transitional role. Freschi (1999) recommends that before a one-to-one aide is assigned, a justification review should be completed which details the need for a one-to-one aide and the goals that will be attained. Training of the aide for the specific needs of the child is deemed critical. A plan for evaluating the use of the aide as well as a plan for fading the use of the aide are also considered key elements in implementing one-to-one services. Guidelines proposed by Freschi (1999) and others may act as helpful starting points when conceptualizing the formal role and procedural use of one-to-one aides assigned to children with TBI, but these guidelines provide less assistance in actually formulating aide-based intervention strategies specific to children with brain injuries.

It is also useful to consider interventions designed for children diagnosed with attention deficit hyperactivity disorder (ADHD). Given the limited information available regarding the assignment of one-to-one aides to children with TBI, examining the impact of individualized educational approaches for children with ADHD can be informative, as difficulties with attention, concentration, and behavioral regulation are seen in both populations. While one-to-one aides are rarely assigned to children with ADHD, there are several studies investigating the efficacy of one-to-one *instruction* (i.e., individualized tutoring or instruction delivered by a tutor or teacher who works with a single child) in children with ADHD. Although the role of the one-to-one instructor clearly differs from the paraprofessional role of the one-to-one aide, studies concerning one-to-one instruction are useful for examining the general impact of individualized approaches upon the learning and classroom management of children with executive dysfunction.

In general, studies examining one-to-one instruction of children diagnosed with ADHD confirm the benefits of providing individualized attention to children with disorganized, poorly-regulated classroom behaviors. Strayhorn and Bickel (2002) tested the hypothesis that children with ADHD and oppositional defiant disorder (ODD) would display fewer behavioral symptoms during one-on-one instruction versus classroom instruction. Results indicated dramatic improvement in behavior during individual versus classroom instruction with quantitative and qualitative data indicating increased attention and cooperation during individual sessions. The authors compared their results to studies investigating the efficacy of stimulant medication, and analysis of effect sizes indicated that individual instruction yielded similar or greater positive behavioral changes in comparison to the use of medication in children with ADHD. The authors proposed that individual instruction is efficacious due to provision of an almost continuous schedule of immediate and positive reinforcement for child successes. DuPaul, Ervin, Hook and McGoey (1998) found that one-to-one adult or even peer tutoring resulted in a significant reduction in off task behaviors in children with ADHD. In a major review of studies examining the efficacy of one-to-one instruction for a variety of children placed in special education, Polloway, Cronin and Patton (1986) found that many studies cite an advantage for one-to-one over group instruction, but that small group instruction can be efficacious as well and might be more efficient and economically feasible.

The studies noted above suggest that one-to-one instructional techniques can result in significant behavioral improvements in behaviorally disinhibited children, and can contribute to greater on-task behaviors critical for learning. While such approaches appear to be at least temporarily efficacious, multiple concerns remain. Perhaps the most salient consideration regarding the use of one-to-one aides is the issue of cost. This often leads to dismissal of one-to-one assistance outright, but closer consideration of the expense issue is warranted. If a child with TBI is placed in a typical classroom setting and fails, the amount of compensatory funds utilized to bring that child back up to appropriate skill levels could potentially exceed the cost of time-limited, prevention-oriented one-to-one service implementation. Moreover, placing children with TBI into large group situations without adequate support may not only be ineffective and frustrating for the child, but may result in disruptions to the class as a whole. While not always the case in actual practice, we conceptualize school-based one-to-one aide services as a transitional, temporary intervention that assists in a more successful school

re-entry process rather than a long term "behavioral solution" requiring ongoing funding.

This brief review raises the possibility that one-to-one services may be a viable and beneficial option for children with a variety of special needs following TBI. However, it remains to be seen if time-limited one-to-one aide services can improve the school reentry process and reduce the incidence of school-based maladaptive behavior in children and adolescents following TBI. We believe that extensive efforts will be necessary to better formulate intervention approaches, assess the efficacy of such services, and determine the financial cost-benefit. Moreover, multiple questions remain, including:

- Should one-to-one aides be assigned at the outset of school reentry to assist in this transition, or should they be assigned several months after the student's return to school when his or her reintegration difficulties are more clearly defined?
- As considerable cognitive/behavioral improvement can be expected to occur within the first 6–12 months following brain injury, how can the benefits of a one-to-one aide be distinguished from the child's spontaneous recovery during this same time period?
- If assigned to address persistent cognitive or behavioral deficits, can time-limited one-to-one services be designed to have more generalized and lasting benefits?
- Can the same level of immediate and generalized benefit be attained when an aide is assigned to several children in a classroom rather than just one?

As a first step in addressing these questions and examining this intervention resource, we propose a model of one-to-one assistance for children with TBI that emphasizes consideration of neuropsychological characteristics of brain-injured children in the development, planning, training, and evaluation phases of one-to-one service delivery. We believe that this conceptual framework will then be useful for hypothesis generation as well as field-testing to further refine the model.

## MODEL

We describe a model for conceptualizing the use of one-to-one aides in helping children with TBI reintegrate into their community school settings. This model is a based primarily upon the authors' extensive experience with the rehabilitation, education, and school reentry of children with TBI. While guidelines and general considerations for the "return to school" transition have been articulated elsewhere (Farmer & Peterson, 1995; Ylvisaker &

Feeney, 1998), it has been our experience that a model of goal planning and intervention is especially necessary if one-to-one aides are to be used effectively for building skills of classroom independence rather than dependence upon external cueing in the school setting. The basic components of the intervention and goal planning model, as well as basic aspirations for its procedural implementation, follow.

## Model of Goal-Planning and Intervention

*Creating Independence versus Dependence.* The dependence/independence continuum is central to the intervention and goal planning model, and represents its first dimension. Along this first dimension, one-to-one services should be assessed regarding the extent to which they either A) facilitate the development of independent classroom functioning, or B) encourage the child's dependence upon the one-to-one aide to sustain classroom performance (Figure 1). These two questions are central in assessing the effectiveness of one-to-one aide intervention in general, as the development of dependence upon the aides for ongoing classroom functioning is a central area of frustration expressed by school administrators.

Dependence upon the one-to-one aide often develops when problematic classroom behaviors displayed by children with TBI are addressed through extensive use of cueing or prompting by the aide. This is illustrated in Figure 2, which presents the case of a child who displays the common post-TBI behavior of rushing through schoolwork and making careless errors in the process. In this situation, one-to-one aides are frequently directed to cue the child to "slow down" and work more cautiously. Moreover, one-to-one aides are frequently instructed to identify mistakes in the child's work in order that the child can make the necessary corrections. While these actions may have the time-limited effect of improving the child's work product, there is little reason to believe that these interventions will have a lasting impact upon the child's future performance. Anecdotal reports provided by teachers of children with TBI suggest that the quality of student work typically improves

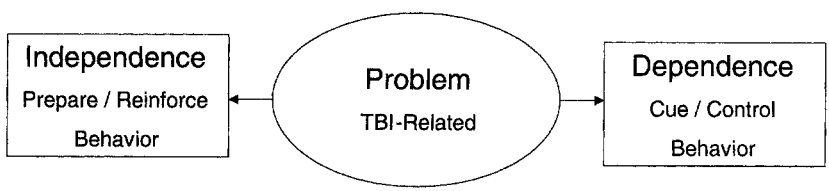


**Figure 1.**

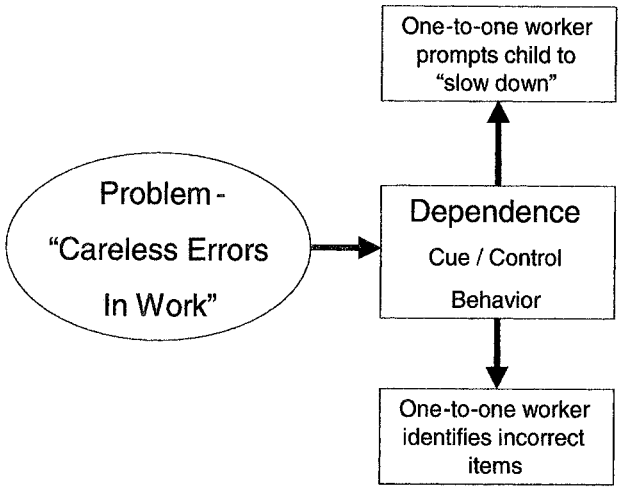


**Figure 2.**

when the one-to-one aide is present and provides this type of cueing, but then approximates baseline levels when the one-to-one aide is absent or if this service is discontinued. As such, an argument could be made that one-to-one aide services provided in this manner actually work against the child's best interest, as it sustains the child in a classroom setting with independent work expectations that are too high for the child to meet if the one-to-one aide service is temporarily or permanently removed.

Rather than emphasizing cueing and behavioral prompting, this conceptual model proposes that the services of the one-to-one aide be used to assist the child in learning effective classroom self-management skills with subsequent reinforcement to support the child's independent utilization of these skills. Even if behavioral cueing cannot be completely avoided, the services of the one-to-one aide should be focused upon building skills that could be easily cued by the teacher when/if the one-to-one aide is not present, thus increasing the potential generalization of these skills and approximating a degree of classroom independence. In the example of the child with TBI who makes careless errors and rushes through his or her work, this type of approach would focus upon building and reinforcing adaptive classroom skills, including time budgeting, self-monitoring, and "self-editing" of work output (Figure 3). This type of focused intervention provides time-limited cognitive scaffolding to assist the child in reintegrating into the classroom

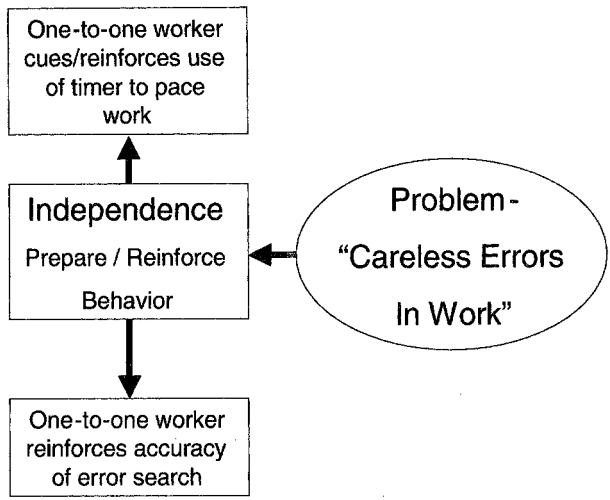


**Figure 3.**

while simultaneously preventing the one-to-one aide from becoming "indispensable."

To further elaborate this point, one intervention that could be developed would involve the teacher, the one-to-one aide, and the child collectively determining the estimated amount of time necessary for completion of an individual classroom assignment. A timer would be set, and the child would be instructed to work until "time was up." If the child reached the end of the assigned task before the timer sounded, he or she would be directed to use the rest of the available time to review his or her work product. Tangible reinforcement would be provided by the one-to-one aide if the child used all of the time allotted for the task. In this manner, the child would be rewarded for working on a task for an adequate duration of time rather than receiving the reward of escaping difficult task demands by rushing through his or her work completion. Moreover, this approach contributes to the development of a classroom skill/procedure that could be easily initiated and prompted by the child's teacher if the services of the one-to-one aide were temporarily unavailable or were discontinued.

*Developing behavioral inhibition and purposeful action.* The second dimension of the intervention model poses that school-based one-to-one aide services should be assessed regarding the extent to which they either A) contribute to the inhibition of impulsive responding, or B) contribute to the organization of goal-directed, purposeful behavior (Figure 4). Unlike the two conflicting components of the first dimension (e.g., dependence versus inde-

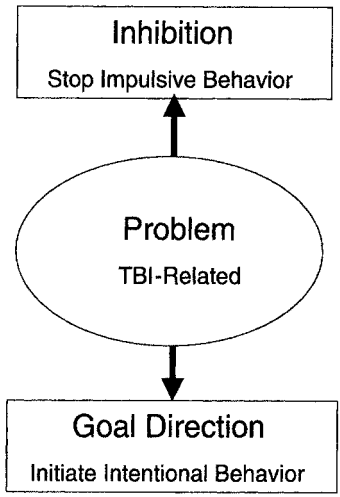


**Figure 4.**

pendence), the components of the second dimension are mutually beneficial and necessary. These two dimensions are based upon theoretical conceptualizations and factor analytic studies of executive functioning in which two general executive functioning components have been identified, i.e., A) inhibition and B) organization of intentional/purposeful behavior (Denckla, 1996; Gioia, Isquith, Guy & Kenworthy, 2000). When intact, these two processes contribute to the child inhibiting a pattern of impulsive responding and subsequently organizing cognitive processes for goal-directed work. In some cases, the negative impact of TBI may result in less difficulty in one of these components (behavioral inhibition) and significant difficulty in the other (i.e., organization of intentional/purposeful action). However, it is not uncommon for both aspects of executive dysfunction to be present following TBI in children.

In the example of a child with TBI who rushes through his or her work, the second dimension of our model could be used to plan interventions to both increase response inhibition and help the child generate intentional goal-directed behavior (Figure 5). The intervention described above (i.e., use of a timer during assignments to reinforce more appropriate time utilization) is addressing the *inhibition* component of executive functioning, as it is designed to specifically address the disinhibition symptom of the child impulsively hurrying through his or her work.

To address the second component of executive functioning, i.e., *organization of intentional/purposeful action*, it will be important for the one-to-one

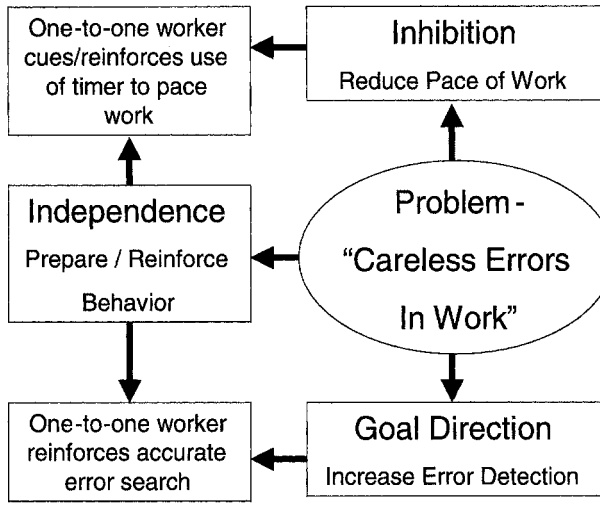


**Figure 5.**

aide to instruct the child in the use of skills to improve the quality of work. To address this area in the noted example, the one-to-one aide should teach and reward self-monitoring and "self-editing" skills to counteract careless work completion. For instance, after the child has received tangible reinforcement for spending adequate time on a task, he or she would be instructed to find as many errors in the work sample as possible (e.g., number of math problems completed incorrectly). Simultaneously, the one-to-one aide would examine the child's work product and tally the number of errors (independent of the child's accounting). The child would then be rewarded if the number of errors that he or she found matches or closely approximates the number of mistakes detected by the one-to-one aide. In rewarding error detection, the child's use of self-monitoring and self-editing skills are reinforced, and the likelihood of independent use of these skills in the classroom is strengthened.

*Additional example of goal-planning and intervention model.* A second example illustrates the conceptual model described above to develop focused goals and intervention strategies for one-to-one aides. In this case, the problematic behavior is classroom elopement secondary to frustration. Impulsively leaving the classroom is a symptom of disinhibition common in children following TBI. This was one of the most commonly cited problem behaviors identified by Maryland school officials that had led to the assignment of a one-to-one aide, and is therefore a relevant behavioral example for further explanation of the goal-planning and intervention model. The various com-

ponents of the goal-planning and intervention model for the elopement example are depicted in Figure 6.

At the outset of the goal-planning and intervention formulation process, it is important that the target behavior be adequately described and systematically assessed (see aspirational guidelines below). While there are multiple situations under which children may impulsively leave the classroom, it has been our experience that many such incidents are precipitated by confusion and/or frustration associated with classroom demands. Thus confusion/frustration is identified as a contributing factor to elopement in the example provided below.

The first model dimension, *independence versus dependence*, is particularly important when one-to-one aides are attempting to address symptoms of behavioral disinhibition associated with TBI. In the case of classroom elopement, many commonly employed intervention strategies include the one-to-one aide blocking the classroom doorway and providing behavioral prompting to "sit down" when elopement behavior is displayed (Figure 6). This type of behavioral cueing can actually lead to further dependence upon the one-to-one aide for the purpose of ongoing classroom behavior management, as there is no clear skill that has been learned and there is no pattern of adaptive response (to frustration) that has been reinforced or strengthened. While elopement can be temporarily prevented using such techniques, elopement attempts will likely continue and may be indirectly reinforced by the attention they receive from the one-to-one aide.

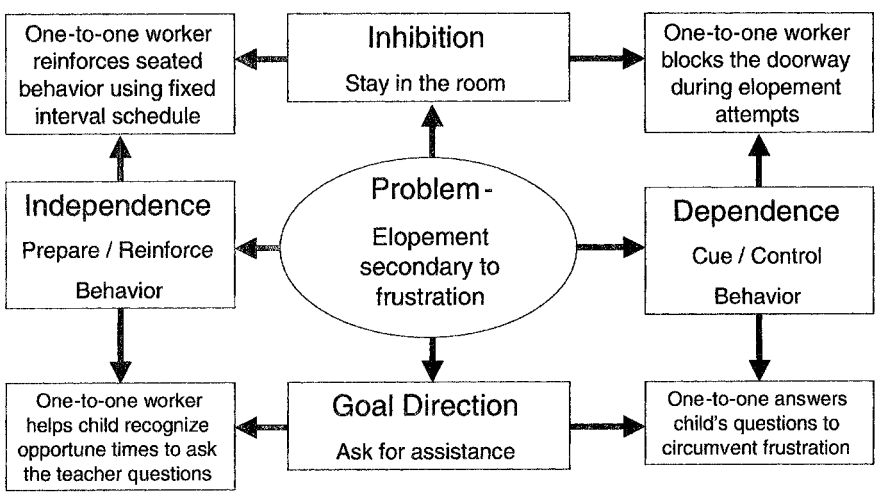


**Figure 6.**

In contrast to cueing and prompting, an emphasis placed upon skill training and associated reinforcement can make a powerful contribution to the child's growing classroom independence and adaptive functioning. In the elopement example, the one-to-one aide could be a valuable resource in providing frequent tangible reinforcement when the child displays the skill of "remaining seated," i.e., a behavior that is both "on task" and also incompatible with the problematic behavior of leaving his or her seat/classroom (Figure 6). Children with TBI frequently require an increased level of behavioral reinforcement provided in short time intervals in order to inhibit impulsive responding and remain in their seats. The initial demands of the reinforcement schedule can often exceed the practical limitation of the classroom setting. While a teacher cannot typically reinforce "seated" behavior systematically and consistently in short intervals, a one-to-one aide can provide a high level and frequency of classroom reinforcement. In this instance, we believe that classroom independence increases when the one-to-one aide strengthens the child's ability to remain seated by providing reinforcement (e.g., points, tokens, stickers, etc.) on a schedule appropriate for the child's needs. If the one-to-one aide is absent or if the service is discontinued, the teacher has a better chance of implementing a less rigorous schedule of reinforcement for seated behavior if this skill/behavior has already been targeted and strengthened during the time-limited period of intensive one-to-one aid intervention and reinforcement.

The second dimension of the goal-planning and intervention model involves crafting interventions that contribute to both *behavioral inhibition* and the *organization of intentional/purposeful behavior*. These are two larger factors of executive functioning that are often disrupted by TBI. Two approaches for addressing the *disinhibition* aspect of classroom elopement, with the goal of increasing the time in which the child remains in his or her seat/classroom were described above. One of the interventions is thought to contribute to increased classroom independence (i.e., interval reinforcement of seated behavior) while the other is thought to build increased dependence/reliance upon the one-to-one aide (i.e., behavioral prompting to remain in the classroom and to "sit down.").

Although classroom elopement can be a highly impulsive/disinhibited behavior, it is very important to conduct goal planning and intervention in a way that strengthens *intentional/purposeful behavior* as well as contributing to *behavioral inhibition*. Interventions that increase goal-directed behavior may be more difficult and less obvious in response to classroom elopement, but equally important in reducing the likelihood of disinhibited behavior and

contributing to a generalized benefit of time-limited one-to-one aide interventions.

In the example of the child who elopes secondary to classroom frustration/confusion, a key skill that must be learned/relearned for purposeful and organized classroom functioning is the ability to adaptively elicit assistance from the instructor. Unfortunately, this is not as simple as cueing the child to ask the teacher for help, as patterns of disinhibited behavior following TBI can contribute to a tendency to interrupt class activities/lectures at inopportune times with perseverative questioning. In many classroom instances, the one-to-one aide is instructed to prevent the child with TBI from asking questions or is instructed to field these questions himself or herself in order to minimize the disruption posed to the classroom. Intervening in such a way may provide a temporary benefit to the teacher and other class members, but also makes the one-to-one aide increasingly indispensable to the classroom routine.

If structured appropriately, the one-to-one aide intervention could be used to address this problem in a more adaptive, independence-focused manner. Specifically, the role of the one-to-one aide in this situation is to instruct the child in recognizing opportune times to ask questions based upon classroom pragmatics and nonverbal cues (e.g., pauses in classroom lecture, close physical proximity to the teacher). Once the child displays an understanding of these cues, he or she should then receive reinforcement from the one-to-one aide if his or her requests for assistance are presented at appropriate times based upon this criteria. While the child may still require assistance in identifying opportune times to ask questions of the instructor, the teacher may be capable of giving this assistance without the one-to-one aide being present if these skills have been intensively taught and reinforced for a targeted period of time.

*Aspirational Guidelines for Using One-to-One Aide Services:* The model for planning time-limited classroom interventions using a one-to-one aide assumes a degree of proactive planning for intervention as well as the active and ongoing collaboration between different school-based disciplines. We have identified several guidelines for this process to increase the prospects of success as well as to increase the chances of independent classroom functioning when one-to-one aide services are removed or progressively reduced. In addition to crafting goals and interventions that encourage classroom independence, the principles identified below can further increase the effectiveness of school-based one-to-one aide services.

1. *Solicitation of input from the child when crafting one-to-one aide interventions.* If children are aware of cognitive/behavioral deficits following TBI, they can often propose creative behavioral solutions that they find internally and "intuitively" meaningful. Utilizing self-generated (rather than externally imposed) behavioral strategies can greatly increase the child's acceptance of the intervention as well as improving his or her general behavioral compliance.
2. *Frequent modification of rewards and reinforcement strategies.* When used with children following TBI, behavioral reinforcements are most powerful when they are novel and unique. Behavioral intervention programs in general are less effective when rewards become routine and overly familiar. Change rewards and/or reinforcement strategies at least every two weeks.
3. *Training for one-to-one aides in the sequelae of TBI and related intervention strategies.* Familiarity with the symptoms of TBI and the course of recovery are critical for the one-to-one aide. This is particularly important for paraprofessionals who will be spending extensive periods of time with the child in highly stressful settings. We believe that training the one-to-one aide in the sequelae of TBI can facilitate a contextual understanding of the child's disinhibited/disorganized behaviors, and can help prevent the one-to-one aid from attributing these behaviors to the child's personality and/or personal character. Specific instruction in behavioral techniques used with this population can also help the one-to-one aide understand the method of strengthening behavior and prevent later opposition to intervention methods (e.g., reluctance to use "bribery").
4. *Regular supervision from the specialist who is coordinating the student's behavioral plan.* Supervision is necessary for learning specific behavioral techniques, monitoring the one-to-one aide's implementation of the behavior plan, and instructing the one-to-one in specialized assessment techniques. Moreover, an effective behavioral reinforcement plan will require frequent updates in terms of level of intervention, novelty of rewards, and reinforcement schedules. Frequent communication between the one-to-one aide and the behavioral specialist is crucial for ensuring that behavioral reinforcement plan revisions are implemented consistently and accurately.
5. *Opportunities for the child to make mistakes.* Many one-to-one aides feel pressure to control the child's behavior and ensure that classroom disruptions are minimized. While vigilant anticipation of impulsive action is an important component of the one-to-one aide's classroom responsibilities, we believe that this practice can contribute to an over-reliance

upon the one-to-one aide by both the teacher and child. Delaying the presentation of behavioral prompts presents the child with the opportunity to independently initiate and use adaptive classroom skills. Moreover, this practice provides the educational/treatment team with valuable information regarding which areas of independent skill utilization are developing and which areas remain lacking (e.g., initiation, sustained attention, knowledge sets, self-monitoring of performance).

6. *Provision of time for the one-to-one workers to conduct data collection.* Behavioral interventions that utilize a one-to-one assistant should have an empirical approach, in which the one-to-one aide is trained in collecting frequency and/or interval data that can be used to assess the effectiveness of different intervention strategies. Data collection methods should be developed by the behavioral specialist, and the one-to-one aide should learn these methods through supervision/training sessions. At least a portion of the one-to-one aide's time should be committed to collecting this type of data on a weekly basis. For instance, if the child's behavioral plan provides for reinforcement of seated behavior on a fixed 15-minute interval schedule, the aide should periodically remove himself or herself from the intervention role and systematically collect data regarding the child's ability to perform this behavior with minimal external reinforcement from the one-to-one aide. In this case, the one-to-one aide could be used to identify the number of 15-minute intervals during the school day in which the child leaves his or her seat. Similarly, scheduled assessment days could be used to identify the ratio of appropriately and inappropriately timed requests for teacher assistance made by the child during the day. When fulfilling this data collection role, the one-to-one aide provides valuable information regarding the extent to which the child has mastered the targeted skills as well as the impact that the child's skill utilization has had upon his or her identified problem behaviors.
7. *Data based decision-making concerning the continuation/termination of school-based one-to-one aide services.* Routinely collected data concerning the child's classroom behavior and independent skill utilization data should be reported to the IEP team to assist in determining the child's need for intervention in the future. Unfortunately, decisions are often made by IEP teams to discontinue one-to-one aide services when the child shows behavioral improvement, only to have the child's behavior deteriorate when this level of support is removed. Rigorous data collection that includes periodic assessment of what the child does in the classroom when the one-to-one aide does not provide behavioral cueing is critical

for decision-making. In this manner, the IEP team can make service intensity decisions based on data describing what the child can do with minimal prompting/reinforcement as well as what the child can do with ongoing one-to-one interventions.

## SUMMARY

This intervention and goal-planning model is a useful starting point for conceptualizing and planning the use of one-to-one aide interventions with children following TBI. The heuristic itself, however, is considered to be a work in progress that is still in need of empirical support. Considerable research efforts and field testing will be necessary to generate empirical data regarding the efficacy of the multiple components of the model. In this effort, multiple research questions remain, including the identification of the optimal point for one-to-one aide intervention in the school reentry process, distinguishing between spontaneous vs. intervention based gains, and monitoring the degree to which such services have a generalized effect upon the child's classroom functioning. Data from these types of studies can be used to generate more comprehensive empirically derived guidelines to be utilized by school districts in their ongoing use of one-to-one aide services.

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