

TRAUMATIC BRAIN INJURY: TEACHER KNOWLEDGE AND SKILLS

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TRAUMATIC BRAIN INJURY: TEACHER KNOWLEDGE AND SKILLS

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ABSTRACT
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This survey examines teacher knowledge of Traumatic Brain Injury (TBI). Previous research has indicated teachers lack adequate knowledge of TBI. Also, students with TBI often go without special education services as a result of under-identification of TBI as a disability category within schools. The present survey examines teachers' knowledge, skills, and training related to TBI. Participant responses reveal that teachers are only somewhat knowledgeable about TBI and the majority of respondents had not received training on TBI. Results reveal that teachers with TBI training are significantly more knowledgeable than those without training.

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Introduction

Traumatic Brain Injury (TBI) is a significant issue for educators in U.S. public schools. Of the approximately 1.4 million TBIs that occur in the U.S. each year, 635,000 happen to children between ages 0-19. While the great majority of these children recover, even mild TBIs can lead to impaired functioning (Langlois, Rutland-Brown, & Thomas, 2004). In 1992, Begali found that over 90% of children survive TBIs due to medical advances; that number is likely even higher today. While clearly this is a positive development, students with TBI pose a challenge for teachers and other school personnel who must educate them upon return to school. In order to effectively educate students with TBI, teachers need to be knowledgeable about the effects of the injury on behavior and cognition, and they need to feel confident in their own ability to teach students with TBI. However, many teachers and other school staff lack awareness of the consequences of TBI, which creates a less-than-ideal learning environment for students with TBI (Farmer & Peterson, 1995). Before programs can be developed to improve the level of teacher knowledge and skills regarding TBI, it is necessary to determine current levels of knowledge and skills.

The purpose of this study is to determine current levels of teacher knowledge and skills related to TBI. Because teachers have the most direct contact with students of all school staff, it is vital that they are knowledgeable about TBI and are skilled in the education of children with TBI so students with TBI can receive a high-quality, appropriate education.

Literature Review

Traumatic Brain Injury

TBI is a term used to describe acquired injuries to the brain (Jantz & Coulter, 2007). The National Center for Injury Prevention and Control defines a TBI as “a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain” (Centers for Disease Control and Prevention, 2008). TBIs can happen many ways, but the most common causes of TBI for all age groups are falls, motor vehicle accidents, blows to the head, and assaults. The leading causes of TBI in children are falls and motor vehicle accidents, with all other categories representing the minority of TBI cases annually (Langlois et al., 2004). TBIs vary widely in severity and are typically measured using the Glasgow Coma Scale, which ranks head injuries on a scale from 3-15, with 3 being the most severe and 15 being the most mild (Teasdale & Jennett, 1974). Medical records of TBIs generally reflect the level of care required to treat the injury, including emergency department visits, hospitalizations, and deaths. The majority of head injuries are measured as “mild” on the Glasgow Coma Scale; similarly, the majority of head injuries require only emergency department visits rather than extended hospitalizations (Langlois et al., 2004; Yeates, 2000).

TBI Under IDEA

Children comprise the age group most likely to visit an emergency room following a head injury; they are also least likely to die from a TBI (Langlois et al., 2000).

This translates into a large number of children who sustain a TBI and return to school with special needs that must be met due to changes in cognitive and behavioral abilities.

In 1975, the Education for All Handicapped Children Act was passed, and children with TBI could then be served in the special education system under the category “other health impaired” (Bullock, Gable, & Mohr, 2005). In 1990, the Individuals with Disabilities Education Act (IDEA; P.L. 101-476), was amended to include Traumatic Brain Injury as a specific disability category for special education (U.S. Department of Education, 1990). To qualify under the category of TBI, the following definition was put into the IDEA law:

...an acquired injury to the brain caused by an external physical force, resulting in a total or partial functional disability or psychosocial impairment, or both, that adversely affects a child’s educational performance. The term applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psycho-social behavior; physical functions; information processing; and speech. The term does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma (34 C.F.R. 300.7(c) (12) (U.S. Department of Education, 1990).

This was an improvement for children with TBI, who had been frequently misplaced in the special education system before this law was enacted. Prior to the change, students with TBI were often placed in classrooms for children with other

disabilities, such as cognitive or learning disabilities, or emotional disturbances (Begali, 1992).

The 1990 IDEA law brought awareness to TBI, and educators and activists began to realize children with TBI have different needs in a classroom than students with other disabilities. Researchers who study TBI have found it to be different from other disabilities for three main reasons: First, the suddenness of change in students' physical condition causes uncertainty about what may be possible in the future, and also changes the way students maneuver the environment in the present. TBI may negatively affect many facets of students' abilities including coordination, walking, seeing, and hearing. Second, students' cognitive abilities are affected and they may find it difficult to remember things, reason logically, understand previously known words, or organize materials. These cognitive changes may be short- or long-term. Finally, social, emotional, and behavior changes take place after a TBI. Students may have sudden mood changes, anxiety, depression, lack of self-control, aggressiveness, irritability, hyperactivity and a host of other behavior changes following a TBI (Bullock et al., 2005).

All of these difficulties can impact a student's ability to learn in a classroom. Because these issues occur after a sudden injury, students with TBI have learning needs that differ significantly from students who struggle with a disability that has been continually present in their lives. The re-authorizations of IDEA since 1990 have continued to include TBI as a disability category (U.S. Department of Education, 2004).

Educational Limitations Following TBI

Behavior Deficits. One of the educational limitations that can arise after a child sustains a TBI relates to change in behavior. TBI has been found to increase the

likelihood of behavioral problems in the academic environment (Hawley, 2004; Yeates, 2000; Yeates & Taylor, 2006). Children who have sustained a TBI have been observed to have difficulty:

...remaining focused on academic tasks, developing positive peer or teacher interactions, accepting their limitations, maintaining a consistent mood, controlling anger, accurately remembering events, accepting responsibility for their actions, saying things without thinking about consequences, waiting to begin working, appearing to be apathetic, being reluctant to engage in activities and engaging in incongruent emotional responses, (Jantz & Coulter, 2007, p. 88).

Teachers must not misinterpret these behaviors as malicious or intentional, but rather must recognize that the behaviors are often direct effects of a child's TBI (Glang, Tyler, Pearson, Todis, & Morvant, 2004; Jantz & Coulter, 2007). Interestingly, while researchers have consistently found that TBI results in elevated levels of behavior problems, it has also been found that students with behavioral difficulties are at an increased risk of sustaining a TBI. Thus, pre-injury abilities and behaviors must be taken into account when creating educational plans for students with TBI who exhibit behavioral problems (Yeates, 2000).

Cognitive Deficits. In addition to behavioral concerns after a TBI, the child is likely to suffer from cognitive difficulties. Up to two-thirds of children who sustain a TBI will experience long-term difficulties with cognition (Boyer & Edwards, 1991). Unfortunately, TBI appears to affect many facets of cognitive ability that results in a negative impact on academic performance. Glang and colleagues (2004) describe several

cognitive effects resulting from a TBI that include problems in general intellectual functioning, memory and attention, and visual-motor abilities. They identify deficits in executive motor functioning, including impairments in the ability to organize, plan, and monitor behavior. These findings have been echoed by many researchers who study children with TBI (Jantz & Coulter, 2007; Loken, Thornton, Otto, & Long, 1995; Slater & Kohr, 1989; Thompson, et al., 1994; Yeates, 2000; Ylvisaker & Feeney, 1998).

Underidentification of Children with TBI in Special Education

The addition of TBI as a disability category has allowed many students with TBI to receive special education services to lessen the impact of the behavioral and cognitive impairments caused by their injury, but there are still many students who sustain TBIs who do not receive special education services upon return to school.

The majority of the 635,000 TBIs children between the ages of 0 and 19 sustain annually are mild enough to be treated out of hospitals, but 60,000 children are hospitalized because their injuries are moderate to severe (Langlois et al., 2004). Of the children who are hospitalized, it is estimated that half will not completely recover and will show long-term changes in behavior, cognition, and/or physical ability (National Pediatric Trauma Registry, 1993). These 30,000 children with long-term deficits comprise the population expected to need special education services under the TBI disability category upon return to school, but the data from Individuals with Disabilities in Education Improvement Act (IDEIA) show many of these children do not receive those services.

According to IDEIA data from 2007, there were 23,805 students who received special education services under the TBI category (U.S. Department of Education, 2007).

This is a significant gain from 10 years ago when only 12, 934 students received special education services, but it still suggests a discrepancy between the number of students who sustain a moderate-to-severe TBI (30,000 *per year* expected to need special education) and the number of students receiving services in schools (23,805 *total* K-12).

Child count data from 1998-2007 indicate that the number of students receiving special education services under the TBI disability category has grown by only 1,087 students per year (U.S. Department of Education, 2007). This number falls far short of the estimated 30,000 students who acquire moderate or severe TBIs each year and are likely to need special education services. In fact, if the system was saturated, and all students likely to need services under the TBI category were receiving them, there would be 390,000 students receiving special education services under the TBI label from grades K-12 in total (Glang et al., 2004). The same researchers contend that even if only 1/3 of students who are likely to have educational limitations due to their TBI received special education services, there would still be 130,000 students being served under the TBI category. However, the most recent data from the 2007 school year suggest there are only 23,805 being served (Glang et al., 2004; U.S. Department of Education, 2007).

School Staff Knowledge of TBI

One possible reason for the disparity between the number of students injured and the number receiving special education services in U.S. schools is that teachers and other school staff members historically have not had adequate knowledge of TBI (Carney & Schoenbrodt, 1994; Glang & Todis, 1993). The following sections describe what is known about teacher knowledge. Most research regarding school staff knowledge of TBI was completed in the 1990's due to the addition of TBI as a disability category in 1991.

Since that time, little research has focused on this topic, which is why many of the sources cited here are not more current. Parent perceptions of teacher knowledge are also discussed, as is the knowledge of other school personnel, such as school psychologists and speech pathologists.

Teacher Knowledge. Research of teachers has shown that they generally do not understand TBI and its effects on students (Bigler, Clark, & Farmer, 1997; Frank, Redmond, Ruediger, & Scott, 1997; Glang & Todis, 1993). Information on this topic is difficult to find, as research on teacher knowledge of TBI is not common. In a survey of teachers, it was found that teachers' level of TBI knowledge was moderately low with a response accuracy rate of 71%. They reported feeling "somewhat prepared" to meet the needs of students with TBI (Glang & Todis, 1993). Another study had similar results, finding that teachers do not possess adequate knowledge of TBI and report feeling unprepared to educate students with TBI (Cooley & Glang, 1994).

A likely reason for teachers' lack of knowledge can be found by examining the amount of training they received on TBI. College courses that specifically educated future teachers about TBI were only available in 10 states in the year 2000, and the majority of teachers do not have formal education regarding TBI because of this deficit (Markowitz & Linehan, 2001; Tyler, 1997). Teachers are more aware of the effects of TBI than the general population, but they are less knowledgeable than people in rehabilitation who work with students with TBI before they return to school following injury (Farmer & Johnson-Gerard, 1997).

Educating teachers about TBI is a major initiative by advocates for students with TBI. Teacher training is considered the top priority to cause positive change for students

with TBI in schools (Merino, 2000). Another researcher concluded that “Having a teacher with both knowledge about brain injury and a feeling of self-competence may be crucial to the success of children with TBI in the classroom,” (Farmer & Peterson, 1995, p. 5).

Parents’ Perception of Teacher Knowledge. Other key players in the successful education of students with TBI are parents. In a survey of parents whose children had sustained a TBI, it was found that most parents were not pleased with how well the school met their child’s educational needs (Glang & Todis, 1993). Parents’ responses indicated that the schools were physically accessible for their children, but in all other areas surveyed, the school was rated as performing at either a “poor” or “less than satisfactory” level. A major concern for parents was the level of staff knowledge of TBI, which 46% of parents surveyed cited as a reason for the school’s unsatisfactory performance. Half of the parent respondents suggested additional TBI training for teachers as a way to improve the quality of education offered at the school (Glang & Todis, 1993).

In another parent survey, it was found that 93% of parents found it to be *easy* or *very easy* to procure academic support for their child with TBI; however, the same could not be said for behavior support. Only 40% of parents responded that it was *easy* or *very easy* to get necessary behavior support (Gfroerer, Wade, & Wu, 2008). As discussed previously, behavior problems tend to be significant following a TBI, and can lead to a decline in academic performance (Yeates, 2000). These results provide further indication that additional training is needed for teachers on the topic of TBI (Gfroerer et al., 2008).

Other School Staff Knowledge. School psychologists also play a role in the education of students with TBI. They are often the liaison between the hospital and the school during the transition back to school following injury, and also provide assessment and monitoring for children who have sustained a TBI once they have returned to school (Hooper, 2006). Because they are usually the most knowledgeable school staff member regarding neurological disorders, school psychologists have a responsibility to understand TBI so they can teach others in their building about the effects of brain injuries. However, school psychologists also receive little training on TBI before entering the workforce (Glang et al., 2004).

Speech-language pathologists have also been the subject of previous survey research. Over one-third of those surveyed either did not know or would not answer questions about federal legislation concerning TBI, but many were able to correctly name and describe characteristics that students with TBI typically display (Hux, Walker, & Sanger, 1996). Because respondents were classified by their level of training on TBI, researchers discerned that training does result in increased knowledge and increased self-confidence related to working with students who have a TBI (Hux et al., 1996).

Overall, school staff knowledge of TBI does not appear to be at an adequate level to provide students with TBI the necessary quality of education. Training is a logical next step for teachers and other members of school staff in order to provide a better educational environment for students with TBI.

Purpose of Current Study

The purpose of this study is to evaluate the current level of teacher knowledge and perceived skills related to instructing students with TBI. Specific questions regarding

past training and experience with TBI, knowledge of the prevalence of TBI, knowledge of characteristics typical of students with TBI, and perception of personal ability to provide services to students with TBI were asked of current teachers via survey.

The survey was modeled on an earlier survey of speech-language pathologists (Hux et al., 1996). Researchers in that study asked respondents about experience with TBI, training on TBI, characteristics of students with TBI, and TBI terminology. While many questions have been altered to apply to teachers or removed due to lack of relevance for teachers, the broad design of the original survey remains intact (Hux et al., 1996).

Teachers' knowledge of TBI has an impact on the quality of education students with TBI receive (Farmer & Peterson, 1995). It is therefore important for teachers to be as knowledgeable as possible on the subject of educating students with TBI. In order to accomplish this goal, it is imperative to have current findings on the topic of teacher knowledge and self-perceptions of TBI. The current study provides such findings and will identify where additional training is necessary.

Methods

Research Questions

This study examined the following questions: What is the current level of teacher knowledge related to TBI? How much, if any, training on TBI have teachers received? What techniques do teachers use to meet the needs of students with TBI?

Based on past research, it was hypothesized that teachers would be somewhat knowledgeable about TBI; would have received little, if any, training on TBI; and would vary widely in how they attempt to meet the needs of students with TBI in the classroom (Bigler et al., 1997; Farmer & Johnson-Gerard, 1997; Glang & Todis, 1993).

Research Design

A survey design was chosen because it allowed the researcher to examine the current level of knowledge of teachers nationwide. It aligned with the goal of the study, which was to determine current levels of knowledge in order to provide data regarding the possible need of additional training for teachers on the topic of TBI.

Participants

The participants in this study were 64 current teachers in the United States, who were contacted via building principals. The researcher randomly selected a state from each of the 5 major regions of the United States (i.e., Northeast, Southeast, Midwest, Northwest, and Southwest) to target in a regional sampling approach to this nationwide survey. Within each selected state, twenty public school districts were randomly chosen from comprehensive lists of public school districts provided by each state's governing agency of education. Using contact information publicly available on school district websites, the researcher contacted every principal in the school district by e-mail, asking

him/her to forward the e-mail message to all teachers so they could then choose whether or not to complete the survey. (See Appendix B). The principals who responded to the researcher indicating they forwarded the survey link to teachers were entered into a raffle for \$1,000 to use towards educational materials in their school. The money for this prize was given by the Western Oregon University Center for Traumatic Brain Injury. After results had been collected, a principal was selected randomly for this incentive and was rewarded \$1,000 for encouraging participation in the study.

The demographic data was comprised of survey items inquiring about highest degree earned, date of completion of highest degree, setting in which the respondent currently is employed, grade the respondent currently teaches, years of experience, and whether the respondent worked in regular education or special education. Participants responded across all demographic categories. (See Table 1). The demographic data presented in Table 1 illustrates that many respondents to this survey received their highest degree in the last 10 years, have a Master’s degree, and teach general education.

In order to ensure confidentiality, all surveys were coded numerically with no way to trace responses back to the participants. No identifying or personal information was collected from participants. Submission of a completed survey served as the participant’s consent to participate in this study.

Table 1. Participants by Demographic Trait		
Demographic Trait	<i>N</i>	Percentage of Participants
General Education	43	67.2%
Special Education	21	32.8%
Teaching Grade PreK	6	9.3%
Teaching Grade K	15	23.4%
Teaching Grade 1	15	23.4%
Teaching Grade 2	11	17.2%

Teaching Grade 3	11	17.2%
Teaching Grade 4	10	15.6%
Teaching Grade 5	11	17.2%
Teaching Grade 6	2	3.1%
Teaching Grade 7	7	10.9%
Teaching Grade 8	7	10.9%
Teaching Grade 9	21	32.8%
Teaching Grade 10	23	35.9%
Teaching Grade 11	24	37.5%
Teaching Grade 12	25	39.1%
Highest Degree- Bachelor's	20	31.3%
Highest Degree- Master's	43	67.2%
Highest Degree- Doctoral	1	1.6%
Highest Degree- Before 1970	1	1.6%
Highest Degree- 1971-1980	5	7.8%
Highest Degree- 1981-1990	12	18.8%
Highest Degree- 1991-2000	11	17.2%
Highest Degree- 2001-2010	35	54.7%
0-5 Years Experience	14	22.2%
6-10 Years Experience	13	20.6%
11-15 Years Experience	8	12.7%
16-20 Years Experience	11	17.5%
21-25 Years Experience	4	6.3%
26+ Years Experience	13	20.6%

Instrument

Data for this study was collected via online surveys (See Appendix A). A survey tool (i.e. Survey Monkey) was used to survey the teachers described in Table 1 above. The items within the survey were mainly structured with a Likert scale that ranked the degree to which the respondent believes each statement provided is true or false. Each question is presented in statement form, with options for the respondent to answer “True”, “Probably True”, “Probably False”, and “False”. This was done to determine how confident respondents were in their responses. If unsure, the Likert scale format provided the opportunity to express that relative uncertainty of response. In addition to

these items, there were also items structured nominally concerning demographic data and several yes/no questions for items concerning past training experiences related to TBI.

The instrument that was used for this study is loosely modeled after an instrument designed by Hux, Walker, and Sanger for a study of speech-language pathologists' knowledge of TBI that was conducted in 1996. Information regarding the reliability and/or validity of the instrument is not known. A pilot test was run on a convenience sample of undergraduate students training to be teachers to ensure that the instrument would allow the researcher to accomplish the goals of the study and that the language of the survey is easily understood by future teachers. The general results of the pilot test indicated that the survey needed to be shortened, as participants appeared to struggle to answer all of the questions. The number of questions in the survey was reduced by half to avoid respondent fatigue and repetitive items.

Results

Forty-nine teachers completed the TBI survey in its entirety. Sixty-three teachers began the survey; those who did not complete the survey were excluded from statistical analyses. Links to this survey were sent via e-mail to 474 building principals across five states on three different occasions. Principals were asked to forward the link to the teachers in their schools. Based on responses received by the researcher, approximately 10 principals forwarded the link to teachers. Respondents were compared based on TBI training and area of education taught (i.e., special education or regular education). See Table 2 for TBI training/experience demographic information.

Table 2. Teachers Trained in TBI		
Trait	<i>N</i>	Percentage of Respondents
Training In TBI	10	15.6%
No Training In TBI	54	85.4%
Type of training: Class/seminar devoted to TBI	8	88.9%
Survey class on disabilities	2	22.2%
Workshop (half-day or more)	3	33.3%
In-service/prof. development	2	22.2%
Experience with TBI: None (0 students)	25	40.3%
Few (1-5 students)	33	52.3%
Several (6-10 students)	3	4.8%
May (>11 students)	1	1.6%
Close friend/family member with a concussion/mild TBI	37	60.7%
Close friend/family member with a moderate-severe TBI	14	25.5%
Personally sustained a	9	14.5%

concussion/mild TBI		
Personally sustained a moderate-severe TBI	0	0.0%

Participants' overall accuracy on the items designed to measure knowledge of TBI indicates that teachers do not have an understanding of TBI and its effect on children. The mean overall score on the knowledge section of this survey was 47% accurate. By subgroups, regular education teachers scored 45.03% correct and special education teachers scored 52% correct. Teachers with TBI training scored 57% correct, whereas teachers with no TBI training scored 45% correct. These percentages were determined based on the Likert scale described above (i.e. "True", "Probably True", "Probably False", and "False". If the statement was actually true, participants received two points for answering "True", one point for answering "Probably True" and zero points for answering either "Probably False" or "False". If the statement was actually false, participants received two points for answering "False", one point for answering "Probably False", and zero points for answering either "Probably True" or "True". A total of 60 possible points was determined, based on 30 questions with two points possible for each. So, each participant received a score between 0 and 60. This score was converted to a percentage, which has been interpreted here as a percentage of questions the respondent answered correctly.

Using a t-test to compare the mean score of knowledge of TBI for teachers who hold a special education certification (N=15; mean score=31.2) with those who hold a general education certification (N=34; mean score=27.02), the difference between the groups' knowledge of TBI was not statistically significant (p=0.057). In this t-test, area

of specialization (i.e., Special Education or Regular Education) was the independent variable and level of knowledge of TBI was the dependent variable. However, those who currently teach special education were generally more knowledgeable of TBI than regular education teachers.

The level of knowledge of teachers with TBI training (N=7; mean score=34.00) versus those without TBI training (N=42; mean score=27.35) was also examined using a t-test. Those with TBI training were more knowledgeable of TBI than those without training at a statistically significant level ($p=0.041$). In this t-test, TBI training (or lack of TBI training) was the independent variable and level of knowledge of TBI was the dependent variable.

Discussion

The overall result of this survey is that the majority of teachers appear to have limited knowledge about students with TBI and the effects of their injury. Among the entire sample of teachers surveyed, the average percentage of statements correctly identified as true or false is less than 50%. When the groups hypothesized to demonstrate a higher level of knowledge of TBI due to experience with children with disabilities and training on the subject are analyzed independently, the level of accuracy is not much improved (special educators percentage correct= 52%; teachers with TBI training= 57% correct). In fact, teaching special education was not a significant factor when comparing the level of knowledge of TBI. Training in the area of TBI did cause teachers to have an improved level of TBI knowledge at a statistically significant level, which is an important finding, as it provides data for advocates and researchers who advocate for increased training for future teachers and current teachers.

To compare the results of this study with a similar study of teacher knowledge of TBI completed in the past, teachers performed worse on this assessment than on a survey of common misconceptions surrounding TBI that was conducted in 1997 (Farmer & Johnson-Gerard). On the survey conducted by Farmer and Johnson-Gerard, teachers demonstrated an incorrect answer average of 20.23%, as opposed to an incorrect answer average of approximately 50% in the survey conducted by this researcher. This indicates that the respondents in the current study may be less knowledgeable than the general

population of teachers, or that teachers were more knowledgeable in 1997 than they are today. However, these are both just hypotheses for the change in TBI knowledge according to these two studies and there are other possible reasons for the change in level of knowledge.

In a previous study, it was found that only 10 states were offering college-level training in TBI to future educators (Markowitz & Linehan, 2001). It is difficult to know if the respondents in this study came from states where college-level training is provided and how the results of the study would vary if the same survey was conducted in those states.

This discrepancy in the rate of correct responses in the two surveys could be due to any number of variables (e.g., time elapsed, training practices, etc.) but could also be due to the participants who chose to respond to the survey invitation. In the 1997 study by Farmer and Johnson-Gerard, participants were educators at a special education conference, whereas in this research study, participants were sought out regardless of interest in special education topics. It is difficult to know if teachers with a greater vested interest in TBI responded to the survey at greater rates, or if some other variable affected the type of teachers who completed the survey. The instrument used for this study was loosely based on a survey measure that was published by Hux, Walker, and Sanger in 1996, but it has not been empirically validated, which is another limitation of this study. This also limits the extent to which results of this survey can be generalized, as the tool has not been empirically validated. It is difficult to compare the results of the current study with past survey research, because the respondent pool cannot be replicated and the questions asked vary for each survey project.

Recommendations for future research would be to compare whether the geographic location of respondents affects their level of knowledge of TBI based on the level of training that is provided to teachers in training in those states.

In summary, the hypothesis proposed by the researcher appears to be true. Teachers are only somewhat knowledgeable of TBI and its effects on children. Although those who teach special education were generally more knowledgeable of TBI than regular education teachers, a significant difference was not present. Teachers in regular education and special education are in need of TBI training in order to more effectively serve children with TBI in schools. However, when provided with training on TBI teachers are more knowledgeable about TBI at a statistically significant level.

The implications of these findings would be valuable to TBI advocates to demonstrate to school administrators and university faculty that training teachers and teachers in training that teachers who are trained on TBI are more knowledgeable of its effects on children and how to appropriately educate them than those teachers without training. The findings would also be valuable to researchers and developers of educational training materials. These groups may be able to indicate the need for additional training for teachers in the area of TBI because training has been found to increase knowledge of TBI at a statistically significant level.

References

- Begali, V. (1992). *Head injury in children and adolescents: A resource and review for school and applied professionals* (2nd ed.). Brandon, VT: Clinical Psychology Publishing.
- Bigler, E., Clark, E., & Farmer, J. (1997). *Childhood traumatic brain injury: Diagnosis, assessment, and intervention*. Austin, TX: PRO-ED.
- Boyer, M., Edwards, P. (1991). Outcome 1 to 3 years after severe traumatic brain injury in children and adolescents. *Injury*, 22 (4), 315-320.
- Bullock, L., Gable, R., & Mohr, J. (2005). Traumatic brain injury: A challenge for educators. *Preventing School Failure*, 49 (4), 6-10.
- Carney, J., & Schoenbrodt, L. (1994). Educational implications of traumatic brain injury. *Pediatric Annals*, 23, 47-52.
- Centers for Disease Control and Prevention. (2008, April 1). *Traumatic Brain Injury*. Retrieved December 1, 2009, from Centers for Disease Control and Prevention: <http://www.cdc.gov/TraumaticBrainInjury/index.html>
- Cooley, E., & Glang, A. (1994). *From isolation to integration: Facilitating school re-entry and inclusion of students with traumatic brain injury*. Denver, CO: Council for Exceptional Children.
- Farmer, J. E., & Peterson, L. (1995). Pediatric traumatic brain injury: Promoting successful school reentry. *School Psychology Review*, 24 (2), 230-243.

- Farmer, J., & Johnson-Gerard, M. (1997). Misconceptions about traumatic brain injury among educators and rehabilitation staff: A comparative study. *Rehabilitation Psychology, 42* (4), 273-286.
- Frank, E., Redmond, K., Ruediger, T., & Scott, W. (1997). Preparedness of educational speech-language pathologists to provide services to students with traumatic brain injury. *Journal of Children's Communication Development, 18* (2), 49-63.
- Gfroerer, S. D., Wade, S. L., & Wu, M. (2008). Parent perceptions of school-based support for students with traumatic brain injuries. *Brain Injury, 22* (9), 649-656.
- Glang, A., & Todis, B. (1993). *Helping parents negotiate the school system*. Eugene, OR: McKay Moore-Sohlberg.
- Glang, A., Tyler, J., Pearson, S., Todis, B., & Morvant, M. (2004). Improving educational services for students with TBI through statewide consulting teams. *NeuroRehabilitation, 19*(3), 219-231.
- Hooper, S. R. (2006). Myths and misconceptions about traumatic brain injury: Endorsements by school psychologists. *Exceptionality, 14* (3), 171-182.
- Hux, K., Walker, M., & Sanger, D. D. (1996). Traumatic brain injury: Knowledge and self-perceptions of school speech-language pathologists. *Language, Speech, and Hearing Services in Schools, 27*, 171-184.
- Jantz, P. B., & Coulter, G. A. (2007). Child and adolescent traumatic brain injury: Academic, behavioural, and social consequences in the classroom. *Support for Learning, 22* (2), 84-89.
- Langlois, J., Rutland-Brown, W., & Thomas, K. (2004). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations, and deaths*.

National Center for Injury Prevention and Control. Atlanta, GA: Center for Disease Control and Prevention.

Markowitz, J., & Linehan, P. (2001). QTA: Traumatic brain injury. *Project FORUM at NASDE*, 4(1), 1-4.

Merino, M. (2000). Special task force convened by the Brain Injury Association to address issues affecting children and adolescents. *TBI Challenge*, 4 (1), 18-19.

National Pediatric Trauma Registry. (1993). *Injuries among children (Fact Sheet No. 2)*. Tufts University. Boston, MA: Department of Rehabilitation Medicine.

Teasdale, G., & Jennett, B. (1974). Assessment of coma and impaired consciousness: A practical scale. *Lancet*, 2, 81-84.

Tyler, J. (1997). Preparing educators to serve children with ABI. In A. Glang, G. Singer, & B. Todis, *Students with acquired brain injury: The school's response* (pp. 323-342). Baltimore, MD: Paul H. Brookes.

U.S. Department of Education. (2007). *Children with disabilities receiving special education under part B of the Individuals with Disabilities Education Act*.

U.S. Department of Education. (1990). *Individuals with Disabilities Education Act (IDEA)*. Washington, DC: U.S. Government Printing Office.

U.S. Department of Education. (2004). *Individuals with Disabilities Education Improvement Act (IDEIA)*. Washington, DC: U.S. Government Printing Office.

Appendix A

Traumatic Brain Injury Survey

Your Current Area of Teaching:

General Education Special Education

Circle Current Grade(s) Taught:

Preschool, K, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Highest Degree Earned: Bachelor's Master's Doctorate

Date Highest Degree Earned: Before 1970 1970-1980 1981-1990 1991-2000
 2001-2010

Areas of certification(s)/license(s) held: General Education Special Education

Were you trained or are you being trained in traumatic brain injury (TBI)?

YES NO

If YES, describe what kind of training you have received:

-class/seminar specifically devoted to TBI? YES NO

-survey class on disabilities? YES NO

-workshop (half-day or more)? YES NO

-in-service/professional development seminar? YES NO

-other(s) _____

Please list any TBI resources that were used in your training (e.g., websites, books, training manuals, etc.):

Teaching Experience:

Years of teaching experience: 0-5 6-10 11-15 16-20 21-25
 26+

Approximately how many students with TBI have you worked with in a school setting?

none (0) few (1-5) several (6-10) many (>11)

Personal Experience:

Do you have a close friend or family member who has ever sustained a:

Concussion/mild brain injury YES NO Moderate-severe brain injury YES
 NO

Have you ever sustained a:

Concussion/mild brain injury YES NO Moderate-severe brain injury YES
 NO

SECTION 1		True	Probably True	Probably False	False
1	TBI is equally common in males and females.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2	A child/adolescent in a coma is usually not aware of what is happening around them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3	After a brain injury, children/adolescents can forget who they are and not recognize others, but be 'normal' in every other way.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4	A brain injury affects girls' and boys' brains differently	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5	Even after several weeks in a coma, when children/adolescents wake up, most recognize and speak to others right away.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6	After a brain injury, it is usually harder to learn new things than it is to remember things from before the injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7	A child/adolescents' s pre-injury status (i.e., intellectual and emotional functioning) is likely to impact recovery from brain injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
8	Children/adolescents who have had one brain injury are more likely to have a second one.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
9	Complete recovery from severe brain injury is not possible no matter how badly the child/adolescent wants to recover.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
10	Children/adolescents are likely to recover more completely from a brain injury than adults due to the greater plasticity of the young brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
11	A child who acquires a brain injury between 12 and 16 will typically present an even pattern of academic strengths and weaknesses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
12	A child's brain, unlike an adult's, is able to "bounce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

back” after a brain injury.

13	It is common for children/adolescents with brain injuries to be easily angered.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
14	Fluctuation among cognitive abilities is a finding typical of children/adolescents who have a brain injury, and not typical of the general population of children/adolescents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15	When children/adolescents are knocked unconscious, most wake up quickly with no lasting effects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16	It is important to provide many details when delivering instructions to a student with brain injury.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17	Greater variability exists in the population of students with TBI than exists in populations of other students with disabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18	The only sure way to tell if someone has suffered brain impairment from a brain injury is by an X-ray of the brain.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19	Knowing the location of brain injury resulting from TBI helps in the development of programming to meet a student’s needs.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20	Many students with TBI display characteristics similar to those of students with LD.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21	Knowledge of a student’s background prior to TBI is necessary when developing an educational plan.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22	Medical labels that specify TBI as mild, moderate, or severe are useful for programming communication and academic services.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
23	The primary goal of brain injury rehabilitation is to increase physical abilities such as walking.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24	Many students with TBI perform better in structured testing situations than they do in classroom settings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25	The challenges of students with TBI are typically more difficult to assess than the challenges of students with other disabilities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

26	Most special and regular educators are knowledgeable about the speech, language, and cognitive communication problems associated with TBI.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
27	Students with TBI often have trouble forming and maintaining friendships.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
28	Recovery following TBI may continue for several years.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
29	Students with TBI often display behavior problems.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
30	Standardized tests are more beneficial than descriptive measures (e.g., language samples, interviews, checklists, observational techniques) in assessing cognitive deficits secondary to TBI.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

C

TION 2

Below are four different scenarios you might encounter in the classroom. For each scenario, consider that the child in question has **CONSISTENTLY** shown the described behavior and it is **NOT** an isolated event. The child may have been identified as having had a traumatic brain injury (TBI) or you suspect that he/she may have had a TBI. Please rate how likely you are to respond in each possible response.

Score **EACH** response by how likely you would be to employ each action in the situation described:



Would never respond in this way
 Fairly unlikely to respond this way
 Not very likely to respond this way
 Somewhat likely to respond this way
 Fairly likely to respond this way
 Very likely to respond in this way

Susan has difficulty paying attention in her 3rd grade class, especially in the afternoon—she is often caught daydreaming or is otherwise distracted but not disruptive. She sometimes complains of headaches. You could:

Reposition her desk to front of room so you can keep an eye on her and maintain her attention.

Would never respond in this way Fairly unlikely Not very likely Somewhat likely Fairly likely Very likely to respond in this way

Send a note home to her parents cautioning about the consequences of continued problem behavior

Would never respond in this way Fairly unlikely Not very likely Somewhat likely Fairly likely Very likely to respond in this way

Consider referring her for ADHD testing.

Would never respond in this way Fairly unlikely Not very likely Somewhat likely Fairly likely Very likely to respond in this way

How confident are you that you could successfully handle a situation like this?

Not at all confident Very little confidence Somewhat unconfident Somewhat confident Very confident Completely confident

All through middle school and now in 9th grade, Dave rarely hands in assignments on time, seldom gets to class before the bell rings and inevitably forgets to bring books or pencil to class. He has the ability to do average work but has problems initiating tasks. You could:

Take Dave’s notebook and use a series of notes laminated in the notebook to outline the steps required for your class.

Would never respond in this way Fairly unlikely Not very likely Somewhat likely Fairly likely Very likely to respond in this way

Say: “You’re in 9th grade now. Make sure you come prepared for class or you may end up in summer school.” or similar warning of the consequences of continued disorganization.

Would never respond in this way Fairly unlikely Not very likely Somewhat likely Fairly likely Very likely to respond in this way

Conference with Dave and his parents to strategize how Dave can get to class on time and be

prepared to participate now that he is in high school.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would never respond in this way	Fairly unlikely	Not very likely	Somewhat likely	Fairly likely	Very likely to respond in this way

How confident are you that you could successfully handle a situation like this?

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Not at all confident	Very little confidence	Somewhat unconfident	Somewhat confident	Very confident	Completely confident

Mary hits, shoves, or pushes peers and/or adults in her 8th grade classes with little or no provocation, and uses aggressive or threatening language. You could:

Teach Mary strategies for identifying impending anger or frustration and allowing her to take in-class time-outs.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would never respond in this way	Fairly unlikely	Not very likely	Somewhat likely	Fairly likely	Very likely to respond in this way

Establish and explain clear rules for expected behavior and natural or logical consequences if the rules are not followed and consistently follow up on established consequences.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would never respond in this way	Fairly unlikely	Not very likely	Somewhat likely	Fairly likely	Very likely to respond in this way

Identify any “triggers” that seem to precede the aggressive behaviors and manage the environment to reduce those triggers.

<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Would never respond in this way	Fairly unlikely	Not very likely	Somewhat likely	Fairly likely	Very likely to respond in this way

How confident are you that you could successfully handle a situation like this?

Appendix B

Informed Consent to Participate as a Research Participant

Traumatic Brain Injury: Teacher Knowledge and Skills

Dear Principals and Teachers:

Principals: Your teaching staff is invited to participate in a study designed to investigate the knowledge, skills, and training of teachers as it relates to students with traumatic brain injuries (TBI). The information teachers provide will clarify how teachers are trained in identifying and responding to the needs of students with TBI. Data collected will allow the researchers the opportunity to analyze current practices and training programs, with the goal of improving identification of and services for students with TBI. **Principals, please forward this e-mail to the teachers in your building so they may have the choice to participate in this study. Principals who forward this e-mail to teachers will be entered in a raffle to win \$1,000 for use towards educational materials in your school. IMPORTANT: Principals must reply to this e-mail so the researcher can enter your school in the raffle for \$1,000.**

Teachers: Your consent to participate in this study will be indicated by your submission of a completed survey. Your participation is voluntary and you can stop answering the survey questions at any time without penalty. Each participant or program will be given a code number and all data will be reported in aggregate form. Only the primary investigators will have access to identifying information. Because you are completing the survey online, absolute confidentiality cannot be guaranteed due to the limited protections of the Internet. There are no anticipated risks involved in participating in this research.

If you decide to participate in this study, please attempt to answer all of the survey questions. The survey should take approximately 10 minutes to complete.

The survey is accessed by clicking on the link below.

<http://www.surveymonkey.com/s/NB6XJBZ>

If you have questions about the study, contact the principal researcher:

Alexandra Walk
400 W. Glendale Ave.
Bedford, OH 44146

937-657-0438
awalk1@notes.udayton.edu

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Questions about the rights of the participant should be addressed to:
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