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An international perspective on educators' perceptions of children with
Traumatic Brain Injury

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Abstract

BACKGROUND: Educators lack understanding of traumatic brain injury (TBI), which can lead to a lack of appropriate assessment and intervention methods for these students.

OBJECTIVE(S): This qualitative study explored what experienced teachers perceive, believe, and know about pediatric TBI.

METHODS: Following development of a standardized interview protocol, 46 teachers from Australia, New Zealand, Northern Ireland, and the United States took part in semi-structured interviews. Topics included understanding of the effects of TBI on school performance, supporting a child with TBI in the classroom, and challenges and teaching efficacy in working with students with TBI.

RESULTS: The themes we identified were: personal experience with TBI, lack of content knowledge, non-TBI-specific adaptations, collaboration with experts, need for specific training, confidence in working with students with TBI, and knowledge of students' rights to service provision. Our findings show that although teachers had little knowledge of TBI, many felt they would be able to adequately support a child with appropriate input from specialists.

CONCLUSION: Teachers fill their knowledge gaps about TBI with their own personal experiences and prior information about working with students with disabilities. These findings support important implications for changes in how we educate and support teachers.

Key words: teachers, knowledge, traumatic brain injury (TBI), qualitative, semi-structured interviews

1.0 Introduction

Traumatic brain injury (TBI) has a significant effect on academic and social functioning in children and youth (Ganesalingam, Sanson, Anderson, & Yeates, 2006; Turkstra, Williams, Tonks, & Frampton, 2008). The challenges that affect school performance for students with a TBI are well documented (Anderson, Catroppa, Morse, Haritou, & Rosenfeld, 2005; Gabbe et al., 2014; Hawley, 2004). Impairment of executive functioning, memory, attention, concentration, and processing speed all contribute to academic difficulties (Gerrard-Morris et al., 2010; Hawley, Ward, Magnay, & Mychalkiw, 2004; Moser, Schatz, & Jordan, 2005). Following TBI, children commonly experience behavioral, psychological, social, and emotional difficulties (Barlow et al., 2010; Li & Liu, 2013; Limond, Dorris, & McMillan, 2009; Ryan et al., 2016). All of these challenges can negatively affect academic performance, which can lead to poor long-term academic outcomes (Babikian, Merkley, Savage, Giza, & Levin, 2015; Davies, Fox, Glang, Ettl, & Thomas, 2013; McKinlay, Dalrymple-Alford, Horwood, & Fergusson, 2002; Prasad, Swank, & Ewing-Cobbs, 2016).

Many children with brain injury are released from medical settings with no plans for long-term rehabilitation support (Kirk, Fallon, Fraser, Robinson, & Vassallo, 2015). Therefore, children who might have ongoing physical, cognitive, or behavioral needs return home to families who are largely responsible for supporting them through the rehabilitation process, with little or no communication between medical providers and educators (Glang, Todis, et al., 2008; Haarbauer-Krupa et al., 2017). For many children with TBI, the primary service provider has become the school.

For decades, it has been clear that a crucial factor in establishing appropriate educational supports for students with TBI is their teachers' understanding of how to do so (Master, Gioia, Leddy, & Grady, 2012; Ylvisaker, Todis, Glang et al., 2001). Recent studies have shown that educators continue to have limited training in TBI (Davies et al., 2013) and a poor understanding of effective instructional and behavioral support strategies (Ettel, Glang, Todis, & Davies, 2016; Linden, Braiden, & Miller, 2013; Mohr & Bullock, 2005). General and special education teachers both demonstrate a lack of knowledge about TBI and significant uncertainty about TBI in school settings, including recovery, service provision, and the socio-emotional effects of TBI (Ernst et al., 2016). A survey of teachers in the United Kingdom found a lack of training in TBI and many misconceptions about the population, which the researchers thought could adversely affect the school experiences of children with TBI (Linden et al., 2013). A recent survey of state directors of special education in the United States provided more evidence for this persistent lack of teacher awareness of TBI (Glang et al., 2015).

To date, most surveys of educator understanding of TBI have preferred quantitative methodologies, using existing knowledge and self-efficacy measures. Because these surveys offer closed-response systems, they could be limited in their ability to accurately capture the breadth of teacher knowledge and experience. Qualitative methodologies can help researchers better understand the role of teacher preparation, teacher training, and self-efficacy in working with students with TBI by giving voice to the breadth of participants' experiences, beliefs, and knowledge (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005; Trainor & Leko, 2014). One qualitative study (Case, Starkey, Jones, Barker-Collo, & Feigin, 2017) used interviews to investigate the knowledge and perceptions of primary school teachers in New

Zealand concerning childhood mild traumatic brain injury (mTBI). They found a spectrum of knowledge regarding the causes, characteristics, and risk factors of mTBI, with the majority of teachers agreeing that they needed information and training to support students with mTBI. Mohr and Bullock (2005) conducted focus groups with educators in the US about their ability to support students with TBI and found that the educators (although somewhat familiar with TBI) lacked formal training, had difficulty producing specific ways to support students experiencing TBI, and expressed interest in enhancing their knowledge.

1.1 Cross Cultural Perspectives on TBI

Pediatric TBI is a global issue that affects individual children, families, and teachers. According to the World Health Organization, it will become the largest cause of pediatric death and disability by the year 2020 making it a public health problem affecting communities worldwide (Hyder, Wunderlich, Puvanachandra, Gururaj, & Kobusingye, 2007). Although researchers from various cultural contexts have documented the importance of a school environment that supports students who experience TBI, there remains a need to explore this issue from a cross-national perspective using the experiences and perceptions of teachers themselves. Simpson, Mohr, and Redman (2000) interviewed individuals from various cultural contexts in Australia and found cultural variations in the understanding of TBI and rehabilitation. However, the authors suggest “a universal experience of TBI that transcends individual cultures” (p. 125) and values attentiveness, friendliness, and guidance from rehabilitation staff. In the present study, we examine the perceptions of teachers in the United States, the United Kingdom (Northern Ireland), Australia, and New Zealand. We chose these countries based on our own home locations and native language (English) and because of their many cultural similarities. Although they differ in their approaches to educational service

provision (e.g., in the U.S. and New Zealand, TBI is a disability category for receipt of services; in Northern Ireland and Australia, it is not), we expected to find clear differences in educational policy and disability service provision that could highlight potential areas for joint learning.

The purpose of this study was thus to gain an in-depth understanding of the perceptions of practicing teachers regarding pediatric TBI and to compare those perceptions across four national contexts in order to better inform how we can educate teachers who are supporting students as they transition back into the classroom.

2.0 Methods

2.1 Design

For this study, we used a qualitative methodology to provide rich accounts of teachers' experience and understanding of pediatric TBI. We used semi-structured interviews to provide a standardized framework from which to question participants while allowing sufficient scope for deviation when important points were raised. Four of this study's authors conducted all the interviews (each in their home country), which were audio recorded and transcribed verbatim to ensure data rigor. Ethical approval was granted by committees in the US, NI, Australia, and NZ. Issues such as informed consent, confidentiality, and the right of withdrawal were explained to all participants prior to study commencement.

2.2 Participants

We used a purposeful sampling technique to select participants for this study so we could explore our variables of central focus (Patton, 2002). Thus, all of the participants (n = 46) were currently working as general education or special education primary or post-primary teachers; they all had more than one year of experience and spoke English as their first

language. The final sample (Table 1) included 10 teachers from NZ, 12 teachers from NI, 12 teachers from the US, and 12 teachers from Australia. The substantial qualitative sample included 6 special education teachers and 40 general education teachers who averaged 10.75 years of classroom teaching experience. Twenty-three teachers taught in primary schools, and the other half taught in post-primary schools in a variety of subjects (English language arts, social studies, science, philosophy, physical education, etc.). The ages of participants ranged from 25 to 63 years, with an average age of 38 years.

Insert table 1 about here

2.3 Data Collection

The semi-structured interviews used a protocol we developed based on our collective experiences working with educators on issues of TBI in the classroom (Figure 1). At the beginning of the interview, the researcher offered a working definition of TBI and invited the participant to share how that definition agreed or disagreed with their current understanding of the term. Next, the interviewer asked several questions to ascertain the participant's knowledge about TBI. Finally, the interviewer presented three classroom scenarios used in a previous study (Ettel et al., 2016) and modified for an international audience. After each of the three scenarios (which escalated in regard to student age and severity of TBI) were presented to the participant, they were asked whether they would feel comfortable supporting that student (self-efficacy), what they would do to support that student, and what supports they would need to help the student be successful in their classroom.

Insert figure 1 about here

2.4 Data Analysis

After the interviews were transcribed and anonymized, we used a multiple-phase thematic analytic process as our primary framework (Braun & Clarke, 2006; Clarke & Braun, 2013) and included strategically implemented methods derived from grounded theory (Corbin & Strauss, 2008; Miles, Huberman, & Saldana, 2014). This allowed us to code, draw connections, and explore emerging themes within our data. To analyze our data, we combined the transcripts to obtain the overarching findings and then made cross-cultural comparisons among the four national settings.

First, the primary coding process required us to read and reread the transcripts to find similarities across concepts, create overarching categories, and engage in constant analysis of concepts within those categories. Second, we developed a set of broad descriptive codes based on the literature and our interview protocol. We used those codes (e.g., barriers, experience, training, collaboration) to apply distinct labels to specific sections of the data, with new and more specific codes emerging as we went. Third, we labeled themes by noticing and later documenting patterns and trends within the categories (Miles et al., 2014), creating a list of definitions for our concepts throughout data analysis. This effort helped us as we followed the iterative process recommended by Corbin and Strauss (2008), which in this study entailed continuous revisiting and recoding of participant responses as we developed new codes, categories, and definitions. We defined themes using phrases or short sentences to describe specific facets or combinations of codes within the data (Saldaña, 2009). Finally, we reviewed and analyzed the themes to identify structures we could use to iteratively construct a theoretical model. We convened to determine where each theme fit within the previously

created categories, and we found that the themes could be divided naturally into three distinct categories: *Experiences*, *Knowledge*, and *Needs*.

3.0 Results

3.1 Experiences

3.1.1. Teachers with personal experience of TBI

Teachers who had a personal experience with TBI (themselves, a close friend, or a family member) had higher self-efficacy in working with students with TBI and were more likely to seek out information about how to work with students with TBI from medical staff and other resources. One teacher from the US described how his experiences had affected his role as a teacher:

I've had roughly five to six concussions of my own. I've dealt with the effects of those concussions in the classroom when I was in high school and into college and then even out of my educational career dealing with the symptoms from brain injuries, too. So I do have quite the experience with them, and I think that helps me in the classroom understand when kids come from football practice, like oh, I got hit, I got hit really hard in the head yesterday in practice. And, okay, well, how are you doing today? And they're like, well, I'm still a little dizzy. I say, okay, you need to go to the nurse... So I think having that awareness in my own past has made me make choices in the classroom for these kids. (US teacher, male aged 29)

This description demonstrates how this teacher applied his own experiences to his teaching practice in meaningful ways.

3.2 Knowledge

3.2.1 Lack of knowledge about TBI frequency and consequences

Of the 46 teachers who participated in the interviews, only 8 participants (17.4%) described receiving any training at all on working with students with TBI. Of those, 4 received formal training during their teacher education program (that they all described as brief and unmemorable), 2 received training in response to a particular student's needs, 1 attended an in-service professional development course, and 1 informally received training from a friend or colleague. Overwhelmingly, educators reported that they were surprised by the high frequency of pediatric TBI. They were also often surprised to learn that a "knock on the head" or "having your bell rung" could have long-lasting consequences for a student's academic, behavioral, or physiological functioning. In fact, most of our participants were unaware that concussions qualified as a TBI. As one educator from New Zealand put it: "it's a common misconception. I would say that concussion is a sudden knock out, and when you wake up, you're better" (NZ teacher, male aged 29).

3.2.2 Non-TBI specific teacher adaptations

When their knowledge of teacher adaptations was lacking (which was often the case), teachers believed that they could apply what they knew about meeting the needs of students with other disabilities to students with TBI without needing to learn specific evidence-based strategies. Despite professing a lack of knowledge about TBI, the teachers believed that their existing skills would translate. When asked what supports they would use for a student with TBI, one teacher from the US said, "I think of all the kind of supports I would put in for somebody with a learning disability, you know, having a planner, writing things down for them, you know, giving them a lot of pre-corrections, and extra time and all of those things, but those seem kind of standard" (US teacher, female aged 38). Many participants already felt overwhelmed with the variety of needs found in their classrooms of diverse learners. One

teacher from NI said, “If I’m brutally honest with you, I think that in a mainstream classroom now there are so many different needs, and there are so many diverse learners around, that I think perhaps it would just be another type of person, or another person in the room that the teacher needed to be aware of” (NI teacher, female aged 29).

3.3 Needs

3.3.1 Collaboration

Of the 46 participants, only 13 (28.3 %) remembered ever seeking out or receiving information on TBI. Of those, four described talking to parents (including parents relating information/directives from doctors), three described receiving information from doctors at a hospital, three reported doing internet research, three described seeking information from a trusted friend or family member, two reported seeking information from school psychologists and other school staff, and one reported seeking information from outside agencies. Although their first instinct was not to look for evidence-based strategies specific to individuals with TBI, almost every teacher mentioned the importance of collaborating with experts, whether they specified school psychologists, medical doctors, or outside agencies. One teacher from New Zealand stated, “Definitely, I would need an outside agency to come in to help and support me” (NZ teacher, female, aged 29). Teachers described the need to create consistency across home, school, and medical settings to best support the student. Not only would this create harmony and improve communication across settings, it would also take advantage of the various strengths and knowledge of each team member.

Most of the teachers described ways in which they value collaborating with families to gain information and provide consistency for student supports. In fact, many of the teachers we talked to reported that most of the information they have about working with students with

TBI had come directly from parents. One teacher from Australia described how parents would likely be her main source of TBI education: “I’ve never really received any training on that, but I think that we, if I was able to sit down and talk with the parents about what the needs were and things like that, then that would be very helpful and then to help me to become more prepared” (AU teacher, female, aged 26). While some expressed the need for joint working, no teacher described any formal or systematic process for collaborating with parents and families.

3.3.2 Specific training

Participants described an overall lack of formal education on how to work with students with TBI. It was primarily the special education teachers who reported some pre-service or in-service education about TBI, but even then, it was rarely comprehensive. For example, a teacher in NI stated:

I think that the biggest challenge is that teachers are not prepared through an actual teacher education, or indeed through continuing professional development, to my knowledge, of any information related to traumatic brain injury. So if you had a child, and going by your statistic here every school has got children in it [with] traumatic brain injury, then I would be saying that there needs to be a much more robust training program, or whether it’s delivered through an actual teacher education or in the ongoing [training] for teachers. (NI teacher, male aged 33)

As their narratives make clear, the few teachers who did receive pre-service or in-service education about TBI often received it reactively (not proactively) following a specific incident in the classroom, school, or district.

3.4 Cross-Cultural Comparisons

Due to the nature of qualitative research and purposeful sampling, we do not purport to make generalizable claims about the overall knowledge of teachers across the various cultures. Instead, we intend to explore dimensions of the teachers' perceptions across countries that point to the complex ways educational practices are culturally situated. The international nature of this work has provided a broader perspective of the experiences of teachers in regard to pediatric TBI than has been previously possible. Although each country's education policies and procedures differ and teachers in each country face different social, political, and economic challenges, the similarities in our findings suggest a widespread lack of available educational support for children with TBI. We recommend that future studies further investigate cross-cultural differences in educating students with TBI.

3.4.1 Self-efficacy in working with students with TBI

Even though the low frequency of formal training and support for working with students with TBI was similar in all four countries, teachers in the US were more confident than those in the other 3 countries that they could meet the needs of students with TBI. Even special education teachers who did not know exactly what they should do in response to the scenarios nonetheless reported that they felt confident that they could support their students with TBI. Very few US teachers stated that they would seek evidence-based information from other sources if they were unsure what to do. Teachers from NI readily expressed a lack of confidence in what they did not know. For example, one teacher in NI stated, "So I think for me there would be that sort of level of, I'm not quite sure what to do, not quite sure when I should be taking further action, when should I be phoning the parents, when should I be phoning the hospital, when should I be phoning an ambulance" (NI teacher, female aged 29).

Another teacher from NI, who had experience working with a child with TBI, stated that “I don’t feel as confident in dealing with it [TBI related symptoms], and that’s probably why teachers have stopped expecting much from him at all, because they are not feeling confident in their own professional capacity” (NI teacher, male aged 33), demonstrating the link between a teacher’s self-efficacy and their ability to show support to students with TBI.

3.4.2 Knowledge of students’ rights to service provision

The participants discussed a variety of ways they would collaborate with others to provide necessary services to their students with TBI. Although each country represented in this sample has legal and procedural processes to ensure the provision of services and supports to students experiencing TBI, teachers in the US were more likely to be able to explicitly describe those laws and processes (NI 42%, AU 25%, NZ 20%, US 75%). This discrepancy indicates cultural variance in teacher knowledge of the systematic provisions in place to support students with TBI in the classroom.

4.0 Discussion

The purpose of this qualitative study was to more deeply explore educators’ experiences and knowledge of childhood TBI across 4 English-speaking countries: the United States, the United Kingdom (Northern Ireland), Australia, and New Zealand. The study’s findings expand on previous research that exposes the lack of teacher training in childhood brain injury.

Most of the teachers who participated in the study had no formal training in TBI. To compensate for this, teachers used their own cultural contexts and generalized knowledge of working with students with disabilities to fill their knowledge gaps. Many classroom-based strategies validated with students with similar learning deficits are effective with students with

TBI (Glang, Ylvisaker, et al., 2008). However, the often complex and multifaceted nature of TBI means that a child can present a unique constellation of challenges that need to be considered. Developing an effective educational program for a student with TBI requires a detailed understanding of their learning profile and the strategies available to support learning, and that requires awareness, knowledge, and skills that our sample of teachers largely lacked.

Teachers described compensating for their lack of knowledge about supporting students with TBI by relying on their personal experiences with TBI and their own confidence or self-efficacy in working with students with other disabilities. Experience with a phenomenon, such as TBI, is linked to greater self-efficacy and understanding of that particular phenomenon (Bandura, 1977, 1997). In the field of education across international settings, self-efficacy in one's ability to teach has been strongly linked to increased motivation and an increased desire to seek out educational strategies, persist with difficult students, and even improve positive outcome expectations for students (Allinder, 1994; Gibson & Dembo, 1984; Vieluf, Kunter, & van de Vijver, 2013). Indeed, the quote above from the 29-year-old female teacher from NI clearly describes the potential link between a lack of professional capacity, a lack of self-efficacy, and a resultant lack of services provided to the student. Our findings suggest that self-efficacy is culturally couched, which speaks to the need to understand the complex ways that culture influences teaching practices. This adds another dimension to previous research findings that personal experience with brain injury is related to greater knowledge and understanding (Linden et al., 2013; O'Rourke, Linden, & Lohan, 2017). Consistent with this area of research, our participants who described experiences with TBI (both their own and that of close friends and family) displayed increased self-efficacy and greater positive outcome expectations for student success in their classrooms. This finding

bodes well for teachers' ability to facilitate success for students with TBI. However, self-efficacy alone is insufficient to effectively manage the complex learning and behavioral needs of students with TBI. Educators need to be trained to use methods that have been validated with students with TBI and to modify strategies validated with students with other disabilities (Dettmer, Ettel, Glang, & McAvoy, 2014; Glang, Todis, Sublette, Eagan-Brown, & Vaccaro, 2010; Ylvisaker et al., 2005; Ylvisaker et al., 2001).

The final key finding from these interviews is that teachers value collaboration with professionals who have expertise in TBI to best serve this population of students. When asked to describe their experiences supporting students with TBI, they focused on their collaborations with other professionals (special education teachers, school psychologists, parents, physicians, school nurses, and providers from outside agencies and organizations). Teachers who did not have such collaborative educational experiences said that seeking them out would be their first step in improving their practice. This is important to note because few teachers described formal collaboration processes within their educational settings. This suggests that emerging practices that formalize such collaboration processes (Dettmer et al., 2014; Gioia, Glang, Hooper, & Eagan Brown, 2015; Glang et al., 2010) could benefit teachers working with students with TBI.

4.2 Implications

The findings from this research point to both established and emerging implications for practice and research. First, although repeated recommendations have been made to include TBI in pre-service teacher education (e.g., Case et al., 2017; Ettel, McCart, & Glang, 2014; Mohr & Bullock, 2005; Ylvisaker et al., 2001), efforts in this area have been minimal in most countries. Until teachers are given adequate training and support, they will continue to

struggle to support students with TBI. We found that because they lack the specific knowledge required to support students with TBI, teachers use other strategies without seeking evidence-based information, and those strategies could be unhelpful at best and detrimental at worst. The second implication for research and practice stems from our finding that teachers strongly value collaboration with others to fill their knowledge gaps, which underscores the need to create formal processes for educators to collaborate with medical professionals, families, other school staff, and outside agencies. The final implication of our findings for both research and practice is the need to gain a more comprehensive understanding of the cultural considerations inherent in teacher knowledge, self-efficacy, and experience working with students with TBI. Often research describes these concepts as culturally neutral, however our findings point to the complexity of this issue and the need for these constructs to be culturally situated. Therefore, evidence-based trainings in TBI for educators should be able to be customized to the individual culture they are serving.

4.3 Limitations

Although we used rigorous methods to explore an under-researched subject, our study has several limitations, primarily related to our sample selection. Although we collected data from four different countries, we experienced limitations based on our geographic constraints. Our sample of teachers was varied in terms of gender, age, and teaching experience; however, due to research resource limitations, we could not include non-English speaking participants, which restricted the range of the phenomena we could capture. All four countries also had relatively high levels of resources for education, research, and disability-focused services. Because of this, we are not able to discuss our research findings in relation to communities,

districts, or countries who do not have similar resources allocated to supporting students with TBI as they return to the classroom.

5.0 Conclusion

For over 30 years, researchers have written about the importance of transition from hospital to school for students with TBI (DePompei & Blosser, 1987; Savage, DePompei, Tyler & Lash, 2005; Ylvisaker et al., 2001). Following TBI, most students return to school environments where educators have little training and awareness of childhood TBI. The findings from this study of four national contexts suggest that the lack of training persists, and support the need for changes in how we educate and support teachers to work with students with TBI on a global level.

Table 1

Teacher Participant Demographic Information By Country

		Country			
		United States	Northern Ireland	Australia	New Zealand
(N=46)	Total	(N=12)	(N=12)	(N=12)	(N=10)
Gender N (%)					
Female	35 (76)	8 (67)	9 (75)	10 (83)	8 (80)
Male	11 (24)	4 (33)	3 (25)	2 (17)	2 (20)
Age N (%)					
25 – 34	18 (39)	3 (25)	5 (42)	4 (33)	6 (60)
35 – 44	14 (30)	7 (58)	5 (42)	2 (17)	0 (0)
45 – 54	10 (22)	0 (0)	2 (17)	5 (42)	3 (30)
55 – 64	4 (9)	2 (17)	0 (0)	1 (8)	1 (10)
Years teaching					
N(%)					
0 – 1	2 (4)	0 (0)	0 (0)	1 (8)	1 (10)
2 – 5	13 (28)	5 (42)	3 (25)	2 (17)	3 (30)
6 – 10	12 (26)	2 (17)	3 (25)	4 (33)	3 (30)
11 – 15	5 (11)	1 (8)	2 (17)	1 (8)	1 (10)
16 – 20	9 (20)	4 (33)	2 (17)	2 (17)	1 (10)
21 or more	5 (11)	0 (0)	2 (17)	2 (17)	1 (10)
Position N (%)					

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Elementary	23 (50)	5 (42)	5 (42)	5 (42)	8 (80)
Secondary	23 (50)	7 (58)	7 (58)	7 (58)	2 (20)
Training in TBI	13 (28)	7 (58)	1 (8)	4 (33)	1 (10)

Appendix A.

Interview Protocol

Script:

Traumatic brain injury is described as any violent injury to the brain following birth, most commonly caused by falls, traffic accidents, or violence. Traumatic brain injury is said to affect 1 in every 5 children by the age of 15 years. Most such injuries will be mild, but even they can result in significant cognitive, behavioral, or emotional difficulties. The effects of TBI are not always immediately obvious and can take months or sometimes years to emerge. Traumatic brain injury is also referred to as *concussion*, *head injury*, *closed head injury*, and *intracranial injury*.

1. What is your understanding of TBI? How does your understanding of TBI compare with the description above? Is there anything in that description that surprised you?
2. That you disagree with?
3. What experience do you have with TBI? Probes: Please discuss your personal, family, professional or other experience with TBI.
4. How do you think you would help/support a child with TBI to learn in your classroom?
5. How do you think a child with TBI would differ from other children?
6. Compared to children with other disabilities, how prepared do you feel you are to teach a child with TBI?
7. What challenges do you think you would face in teaching a child with TBI?

Scenario 1: Emma is a school-aged student who sustained a concussion, or mild traumatic brain injury (mTBI), earlier in the year. She lost consciousness and spent a night in the

hospital. She returned to school, and no one thought anything of it. Later in the same year, she fell in P.E. class and hit her head on the floor. Her parents took her to the doctor who confirmed that she had sustained a second concussion. By Christmas, Emma was failing multiple classes. Fortunately, Emma's school counselor had been tracking her since the second concussion/mTBI and was aware of what was happening. He knew that Emma was having a hard time remembering what her teachers had taught by the time she got home and that homework was difficult. She was also forgetting her materials at school and falling way behind.

1. What supports do you think you would need to manage Emma's educational needs?
2. How prepared do you believe you are to support Emma?

Scenario 2: Troy is a primary school student who had been hiking when he slipped off the side of a steep trail, fell 25 feet down an embankment and cut his head open on the rocks below. The cuts on his head were fairly severe, and he was diagnosed with a concussion. His recovery seemed to be rapid, and he was anxious to get back to school. His parents were relieved at his progress and thought returning to school would be good for him. After Troy's first week back at school, it was clear to his teacher that Troy had some substantial cognitive difficulties. Although Troy had been gone for only a month, he did not remember any of the daily activities that he had participated in before his injury and often seemed confused about what was going on and what he should be doing. Troy became agitated during free time when the class was noisy, and he could not focus on completing his work. He began getting headaches by mid-morning each day and did not return any of the homework his teacher gave him that first week.

1. What supports do you think you would need to manage Troy's educational needs?
2. How prepared do you believe you are to support Troy?

Scenario 3: Victor, a high school student, fell from the top bunk when he was 8 years old, hitting his head on a hard tile floor. This followed a hit to the head with a baseball bat when he and a neighbor were roughhousing about a year before that. After the fall from the bed, Victor began exhibiting erratic behavior, and by the time he was 12 years old it was common for him to have angry (sometimes violent) outbursts and occasionally expose himself at the back of his classroom. He had a hard time sitting still for more than a few minutes and paying attention in class. Teachers stopped expecting much from him at all.

1. What supports do you think you would need to manage Victor's educational needs?
2. How prepared do you believe you are to support Victor?

This concludes our interview. Is there anything else you would like to discuss before we end?

Thanks for taking part.

References

Section 504 of the Rehabilitation Act of 1973, 29 U.S.C. Section 794 et seq. Regulations found at 34 C.F.R. Part 104.

Allinder, R. M. (1994). The relationship between efficacy and the instructional practices of special education teachers and consultants. *Teacher Education and Special Education*, *17*(2), 86-95.

Anderson, V., Catroppa, C., Morse, S., Haritou, F., & Rosenfeld, J. (2005). Functional Plasticity or Vulnerability After Early Brain Injury? *Pediatrics*, *116*(6), 1374-1382. doi:10.1542/peds.2004-1728

Arbogast, K. B., Curry, A. E., Pfeiffer, M. R., Zonfrillo, M. R., Haarbauer-Krupa, J., Breiding, M., . . . Master, C. L. (2016). Point of health care entry for youth with concussion within a large pediatric care network. *JAMA Pediatrics*, e160294.

Babikian, T., Merkley, T., Savage, R. C., Giza, C. C., & Levin, H. (2015). Chronic Aspects of Pediatric Traumatic Brain Injury: Review of the Literature. *Journal of Neurotrauma*, *32*(23), 1849-1860. doi:10.1089/neu.2015.3971

Bandura, A. (1977). Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191.

Bandura, A. (1997). *Self-Efficacy: The Exercise of Control*. New York, NY: W H Freeman/Times Books/Henry Holt & Co.

Barlow, K. M., Crawford, S., Stevenson, A., Sandhu, S. S., Belanger, F., & Dewey, D. (2010). Epidemiology of postconcussion syndrome in pediatric mild traumatic brain injury. *Pediatrics*, *126*(2), e374-381. doi:peds.2009-0925 [pii] 10.1542/peds.2009-0925

Brantlinger, E., Jimenez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). Qualitative studies in special education. *Exceptional Children*, *71*, 195-207.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, *3*(2), 77-101.

Case, R. J. L., Starkey, N. J., Jones, K., Barker-Collo, S., & Feigin, V. (2017). New Zealand Teachers' Understanding of Childhood Mild Traumatic Brain Injury: Investigating and Enhancing Teacher Knowledge and Practice. *New Zealand Journal of Educational Studies*, 1-18.

Clarke, V., & Braun, V. (2013). Teaching thematic analysis: Overcoming challenges and developing strategies for effective learning. *The psychologist*, *26*(2), 120-123.

Corbin, J., & Strauss, A. (2008). *Basics of qualitative research: Techniques to developing grounded theory* (3 ed.). Los Angeles, CA: Sage.

Davies, S., Fox, E., Glang, A., Ettl, D., & Thomas, C. (2013). Traumatic brain injury and teacher training: A gap in educator preparation. *Physical Disabilities: Education and Related Services*, 32(1), 55-65.

Department of Education Northern Ireland. (2005a). Code of practice on the identification and assessment of special educational needs. Retrieved from <https://www.education-ni.gov.uk/sites/default/files/publications/de/the-code-of-practice.pdf>

Department of Education Northern Ireland. (2005b). Recording children with special educational needs - guidance for schools. Retrieved from <https://www.education-ni.gov.uk/sites/default/files/publications/de/sen-guidance-for-schools.pdf>

Dettmer, J., Ettl, D., Glang, A., & McAvoy, K. (2014). Building Statewide Infrastructure for Effective Educational Services for Students With TBI: Promising Practices and Recommendations. *The Journal Of Head Trauma Rehabilitation*, 29(3), 224-232. doi:10.1097/HTR.0b013e3182a1cd68

Ernst, W. J., Gallo, A. B., Sellers, A. L., Mulrine, J., MacNamara, L., Abrahamson, A., & Kneavel, M. (2016). Knowledge of Traumatic Brain Injury among Educators. *Exceptionality*, 24(2), 123-136. doi:10.1080/09362835.2015.1107832

Ettel, D., Glang, A. E., Todis, B., & Davies, S. C. (2016). Traumatic brain injury: Persistent misconceptions and knowledge gaps among educators. *Exceptionality Education International*, 26,(1), 1-18.

Ettel, D., McCart, M., & Glang, A. (2014). Textbook Review. Retrieved from http://media.cbirt.org/uploads/files/textbook_review.pdf

Gabbe, B. J., Brooks, C., Demmler, J. C., Macey, S., Hyatt, M. A., & Lyons, R. A. (2014). The association between hospitalisation for childhood head injury and academic performance: evidence from a population e-cohort study. *Journal of Epidemiology & Community Health*, 68(5), 466-470. doi:10.1136/jech-2013-203427

Ganesalingam, K., Sanson, A., Anderson, V., & Yeates, K. O. (2006). Self-regulation and social and behavioral functioning following childhood traumatic brain injury. *Journal of the International Neuropsychological Society*, 12(5), 609-621.
doi:10.1017/s1355617706060796

Gerrard-Morris, A., Taylor, H. G., Yeates, K. O., Chertkoff Walz, N., Stancin, T., Minich, N., & Wade, S. L. (2010). Cognitive development after traumatic brain injury in young children. *Journal of the International Neuropsychological Society*, 16(1), 157-168.
doi:10.1017/s1355617709991135

Gibson, S., & Dembo, M. H. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology, 76*(4), 569.

Gioia, G. A., Glang, A., Hooper, S., & Eagan Brown, B. (2015). Building statewide infrastructure for the academic support of students with mild traumatic brain injury. *J Head Trauma Rehabil*(epub ahead of print). doi:10.1097/HTR.0000000000000205

Glang, A., Ettl, D., Todis, B., Gordon, W. A., Oswald, J. M., Vaughn, S. L., . . . Brown, M. (2015). Services and supports for students with traumatic brain injury: Survey of State Educational Agencies. *Exceptionality, 23*(4), 211-224.
doi:10.1080/09362835.2014.986612

Glang, A., Todis, B., Sublette, P., Eagan-Brown, B., & Vaccaro, M. (2010). Professional development in TBI for educators: The importance of context. *Journal of Head Trauma Rehabilitation, 25*(6), 426-432.

Glang, A., Todis, B., Thomas, C. W., Hood, D., Bedell, G., & Cockrell, J. (2008). Return to school following childhood TBI: Who gets services? *NeuroRehabilitation, 23*(6), 477-486.

Glang, A., Ylvisaker, M., Stein, M., Ehlhardt, L., Todis, B., & Tyler, J. (2008). Validated instructional practices: application to students with traumatic brain injury. *J Head Trauma Rehabil, 23*(4), 243-251.

Haarbauer-Krupa, J., Ciccio, A., Dodd, J., Ettl, D., Kurowski, B., Lumba-Brown, A., & Suskauer, S. (2017). Service delivery in the healthcare and educational systems for children following traumatic brain injury: Gaps in care. *Journal of Head Trauma Rehabilitation*. doi:10.1097/htr.0000000000000287

Hawley, C. A. (2004). Behaviour and school performance after brain injury. *Brain Injury*, 18(7), 645-659. doi:10.1080/02699050310001646189

Hawley, C. A., Ward, A. B., Long, J., Owen, D. W., & Magnay, A. R. (2003). Prevalence of traumatic brain injury amongst children admitted to hospital in one health district: a population-based study. *Injury*, 34(4), 256-260. doi:[http://dx.doi.org/10.1016/S0020-1383\(02\)00193-6](http://dx.doi.org/10.1016/S0020-1383(02)00193-6)

Hawley, C. A., Ward, A. B., Magnay, A. R., & Mychalkiw, W. (2004). Return to school after brain injury. *Archives of Disease in Childhood*, 89(2), 136-142.

Hyder, A. A., Wunderlich, C. A., Puvanachandra, P., Gururaj, G., & Kobusingye, O. C. (2007). The impact of traumatic brain injuries: a global perspective. *NeuroRehabilitation*, 22(5), 341-353.

Individuals with Disabilities Education Act (IDEA) of 1990, P.-., 20 U.S.C. secs.1400 et seq.

Kirk, S., Fallon, D., Fraser, C., Robinson, G., & Vassallo, G. (2015). Supporting parents following childhood traumatic brain injury: a qualitative study to examine information and emotional support needs across key care transitions. *Child: Care, Health & Development, 41*(2), 303-313. doi:10.1111/cch.12173

Li, L., & Liu, J. (2013). The effect of pediatric traumatic brain injury on behavioral outcomes: A systematic review. *Developmental Medicine & Child Neurology, 55*(1), 37-45. doi:10.1111/j.1469-8749.2012.04414.x

Limond, J., Dorris, L., & McMillan, T. M. (2009). Quality of life in children with acquired brain injury: Parent perspectives 1-5 years after injury. *Brain Injury, 23*(7/8), 617-622.

Linden, M. A., Braiden, H.-J., & Miller, S. (2013). Educational professionals' understanding of childhood traumatic brain injury. *Brain Injury, 27*(1), 92-102. doi:10.3109/02699052.2012.722262

Master, C. L., Gioia, G. A., Leddy, J. J., & Grady, M. F. (2012). Importance of 'Return-to-Learn' in Pediatric and Adolescent Concussion. *Pediatric Annals, 41*(9), 1-6. doi:10.3928/00904481-20120827-09

McKinlay, A., Dalrymple-Alford, J., Horwood, L., & Fergusson, D. (2002). Long term psychosocial outcomes after mild head injury in early childhood. *Journal of Neurology, Neurosurgery & Psychiatry, 73*(3), 281-288.

- McKinlay, A., Grace, R., Horwood, L., Fergusson, D., Ridder, E. M., & MacFarlane, M. (2008). Prevalence of traumatic brain injury among children, adolescents and young adults: prospective evidence from a birth cohort. *Brain Injury*, 22(2), 175-181.
- Miles, M. B., Huberman, M., & Saldana, J. (2014). *Qualitative data analysis: A methods sourcebook* (3 ed.). Washington, DC: Sage Publications.
- Mitra, B., Cameron, P., & Butt, W. (2007). Population-based study of paediatric head injury. *Journal Of Paediatrics And Child Health*, 43(3), 154-159.
- Mohr, J. D., & Bullock, L. M. (2005). Traumatic brain injury: Perspectives from educational professionals. *Preventing School Failure: Alternative Education for Children and Youth*, 49(4), 53-57.
- Moser, R. S., Schatz, P., & Jordan, B. D. (2005). Prolonged effects of concussion in high school athletes. *Neurosurgery*, 57(2), 300-306; discussion 300-306.
- O'Rourke, C., Linden, M. A., & Lohan, M. (2017). Misconceptions about traumatic brain injury among probation services. *Disability And Rehabilitation*, 1-8.
- Patton, M. Q. (2002). *Qualitative Research and Evaluation Methods*. Thousand Oaks, CA: Sage.

Prasad, M. R., Swank, P. R., & Ewing-Cobbs, L. (2016). Long-Term School Outcomes of Children and Adolescents With Traumatic Brain Injury. *J Head Trauma Rehabil.* doi:10.1097/HTR.0000000000000218 [doi]

Ryan, N. P., Catroppa, C., Godfrey, C., Noble-Haeusslein, L. J., Shultz, S. R., O'Brien, T. J., . . . Semple, B. D. (2016). Social dysfunction after pediatric traumatic brain injury: a translational perspective. *Neuroscience & Biobehavioral Reviews*, *64*, 196-214. doi:<http://dx.doi.org/10.1016/j.neubiorev.2016.02.020>

Saldaña, J. (2009). *The coding manual for qualitative researchers*. Los Angeles, CA: Sage Publications.

Simpson, G., Mohr, R., & Redman, A. (2000). Cultural variations in the understanding of traumatic brain injury and brain injury rehabilitation. *Brain Injury*, *14*(2), 125-140.

Taylor, C. A., Bell, J. M., Breiding, M. J., & Xu, L. (2017). Traumatic brain injury–related emergency department visits, hospitalizations, and deaths—United States, 2007 and 2013. *MMWR Surveillance Summaries*, *66*.

The Education (Northern Ireland) Order 1996. (1996). Order No. 274. Retrieved from <http://www.legislation.gov.uk/nisi/1996/274/contents/made>

The Special Educational Needs and Disability (Northern Ireland) Order 2005. (2005). No.

1117. Retrieved from <http://www.legislation.gov.uk/nisi/2005/1117/contents/made>

Trainor, A. A., & Leko, M. (2014). *Qualitative special education research: Purpose, rigor, and contribution*: SAGE Publications Sage CA: Los Angeles, CA.

Turkstra, L. S., Williams, W. H., Tonks, J., & Frampton, I. (2008). Measuring social cognition in adolescents: Implications for students with TBI returning to school.

NeuroRehabilitation, 23(6), 501-509.

U.S. Department of Education. (2015). *IDEA Part B Child Count and Educational*

Environments, Number of children ages 3 through 5 served under IDEA, Part B, by disability and state 2014-15. . Retrieved from

<http://www2.ed.gov/programs/osepidea/618-data/static-tables/index.html#partb-cc>.

Vieluf, S., Kunter, M., & van de Vijver, F. J. (2013). Teacher self-efficacy in cross-national perspective. *Teaching and Teacher Education*, 35, 92-103.

Ylvisaker, M., Adelson, P. D., Braga, L. W., Burnett, S. M., Glang, A., Feeney, T., Todis, B.

(2005). Rehabilitation and ongoing support after pediatric TBI: twenty years of progress. *The Journal Of Head Trauma Rehabilitation*, 20(1), 95-109.

Ylvisaker, M. P., Todis, B. P., Glang, A. P., Urbanczyk, B. M. S., Franklin, C. M., DePompei, R. P., . . . Tyler, J. S. P. (2001). Educating Students with TBI: Themes and Recommendations. *Journal of Head Trauma Rehabilitation February, 16*(1), 76-93.

Zaloshnja, E., Miller, T., Langlois, J. A., & Selassie, A. W. (2008). Prevalence of long-term disability from traumatic brain injury in the civilian population of the United States, 2005. *J Head Trauma Rehabil, 23*(6), 394-400.
doi:10.1097/01.HTR.0000341435.52004.ac