

**WRITTEN PERSUASIVE DISCOURSE ABILITIES OF ADOLESCENTS  
WITH TRAUMATIC BRAIN INJURY (TBI)**

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By Emma Louise Davies

University of Canterbury

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## ABSTRACT

The purpose of this study was to evaluate the performance of adolescents with traumatic brain injury on a written persuasive discourse task. Nine adolescents with TBI (mean age = 14 years 4 months) and nine age, gender and education matched peers completed a written essay on the topic of whether trained animals in circuses should be allowed to perform for the public. Language measures included productivity (number of words, number of T-units and mean length of T-unit) and complexity (number of clauses, clause density and clause breakdown). Pragmatic measures were drawn from the developmental persuasive discourse literature and included essential elements of argument (claim, number of reasons, number of elaborations, conclusion, irrelevancies, repetition of information and attitude). In comparison to their age-matched peers, the TBI group produced significantly fewer reasons to support their claims, significantly more repetitions of information and failed to take alternative perspectives on the topic. There were no significant differences on any measures of language productivity or complexity, however the TBI group performed consistently below their peers on these measures. The results are discussed alongside current literature in the field of discourse production and persuasion. Implications for clinical practice and future directions for research in this area are also offered.

## CHAPTER 1

### LITERATURE REVIEW

#### 1.0 Introduction

The power to persuade in written form is a complex skill combining an array of cognitive, linguistic and social abilities which develops in childhood and continues to progress well into adulthood (e.g. Nippold, Ward-Lonergan & Fanning, 2005; Felton & Kuhn, 2001; Crowhurst, 1990). Persuasion can be used in many forms from political campaigning, to securing a sought after job, to a child ensuring they may play with another's favourite toy. The ability to use persuasion effectively can be challenging (Clark & Delia, 1976; Knudson, 1992; Nippold et al., 2005). Persuasiveness develops steadily from childhood and through to adulthood in individuals with typical development however little is known about persuasiveness in individuals who have suffered some sort of cognitive or linguistic impairment. One clinical population that may be susceptible to deficits in persuasive discourse is the traumatic-brain injured population. Individuals with TBI have been shown to have deficits in other forms of discourse including narrative and expository (Brookshire, Chapman, Song & Levin, 2000; Chapman et al., 1992; Hay & Moran, 2005; Chapman, 1997). Given the complexity of persuasive discourse, combined with the potential problems suffered by individuals with TBI, the question of how individuals with TBI perform on persuasive discourse tasks is relevant to understanding and improving communication skills for this population.

The incidence of TBI peaks in mid to late adolescence with the highest rate of concussion occurring in people aged 15 –19 years (New Zealand Guidelines Group Incorporated [NZGG] & Accident Compensation Corporation [ACC], 2006).

Adolescence is a time of significant development, cognitively, linguistically and socially marked by the need for increasingly sophisticated communication abilities for both academic and peer interactions (Turkstra, 2000). Skills of persuasion are reflected in both the social and education domains (Felton & Kuhn, 2001; Crowhurst, 1990) and have been found to be variable in typically developing teens (Crowhurst, 1990). In New Zealand, persuasive discourse is formally assessed in the later secondary school years under the National Certificate of Education Achievement (NCEA). The high incidence of TBI in adolescence paired with the social and educational demands on persuasive discourse abilities during these years signals this group as at risk more so than any other age group. To date there have been no studies into the persuasive discourse abilities of adolescents with TBI and this is an area of investigation that requires attention.

There are two primary aims for this research:

1. To evaluate the written persuasive discourse abilities of adolescents with TBI compared with age-matched peers who have not sustained a TBI.
2. To determine which, if any, measures of language and pragmatics differentiate the groups.

## 1.1 Persuasive Discourse

Adolescents use a variety of discourse genres when communicating throughout the day, seemingly switching from one form to another within a relatively short time period (e.g., explaining the rules of a game to a friend to retelling the story of what happened to them on the weekend to describing their new bicycle in detail). Discourse refers to connected language and can be separated into interactive (e.g., conversation and negotiation) and non-interactive (e.g., narrative, picture description and procedural description) domains. Discourse can be produced in either written (e.g., newspaper articles, books) or verbal (e.g., class lecture) modalities (Nippold, 1998; Coelho, Ylvisaker & Turkstra, 2005; Chapman, Gamino, Cook, Hanten, Li & Levin, 2006).

Persuasion involves the use of argumentation to convince another person to perform an act or to accept a point of view desired by the persuader and can be both interactive and non-interactive and produced in spoken and written forms (Nippold, 1998). For example debating the topic of whaling to writing a letter to local council requesting action of some sort.

The practical applications of persuasive discourse skills are life long and important in both academic success and functioning in everyday life (Crowhurst, 1990). Furthermore the ability to persuade and use argumentation effectively is considered a fundamental social interaction skill (Felton and Kuhn, 2001; Bartsch, London & Campbell, 2007).

Persuasive discourse of typically developing children and adolescents is an area that has received a lot of attention over the past 25 years in the literature and to a lesser extent in clinical populations such as students with learning disabilities. In

considering the potential performance of adolescents with TBI in persuasive discourse, it is useful to view persuasion through the lens of typical development.

### 1.1.1 Persuasive Discourse in Typically Developing Populations

Persuasion is considered a challenging genre for typically developing writers of all ages (Nippold et al., 2005) with marked differences in ability within and across age groups (Clark & Delia, 1976; Knudson, 1992). General performance in persuasion is considered lesser than in narrative discourse with persuasion described as more cognitively demanding than narrative (Knudson, 1992; Crowhurst, 1990; Felton & Kuhn, 2001).

#### 1.1.1.1 *Requisite Skills for Persuasive Discourse Production*

A number of complex language-based skills are required in the production of persuasive discourse particularly in the written modality. One requires knowledge of the given topic (Nippold et al., 2005) a literate and specific vocabulary (Crowhurst, 1990) use of conjunctions, the ability to extrapolate relevant and irrelevant details, opinion and fact, and production of complex sentences (Hutson-Nechkash, 2004). Other central skills required involve the ability to appeal to an intended audience and organize the argument including an opinion or belief statement, supporting reasons with personal explanations and a summary or concluding statement (Mason & Cramer 2008; Martens, 2007).

In reviewing aspects of teaching persuasive writing, Martens (2007) emphasized the notion that to simply list reasons for a given opinion is not enough; a process of reasoning needs to be demonstrated facilitating the inference that the opinion is justified and true. Another ability instrumental in producing a well-developed and

persuasive argument is the capacity to adapt to the listener or reader's frame of reference and adjust the given argument accordingly (Clark & Delia, 1976; Bartsch et al., 2007). As one would anticipate, greater communicative performance is connected to greater sophistication in persuasive perspective taking (Clark & Delia, 1976).

#### 1.1.1.2 *Development of Persuasive Discourse*

Considering the higher level cognitive, social perspective taking and language skills required to produce an effective argument, a number of authors agree that persuasive discourse is an age related developmental process (Felton & Kuhn, 2001; Crowhurst, 1990; Nippold, 1998; Nippold et al., 2005). There is some contention over at what age persuasive skills begin to emerge and therefore at what age students should be expected to participate in learning and practicing persuasive discourse. Younger children are reported to perform better in spoken persuasion than written, however it has been suggested that this is possibly due to lack of opportunity or instruction in the written mode as opposed to a lack of ability (Rubin, 1984). In support of this, Riley and Reedy (2005) were able to facilitate early argument writing in children aged 5-7 years by offering written structural supports.

In general, younger children tend to produce immature persuasive writing (Knudson, 1992; Crowhurst, 1990). Crowhurst (1990) presented a review of data collected from 10, 11 and 12 year old writers of over 1200 persuasive compositions. Typical features of the younger writers in this age group included: a tendency to inform rather than persuade with increased use of relational function (e.g. "I think it's a great idea"); brief length of essay; little elaboration of the topic; unelaborated reasons that read like a list; lack of conclusion or if present more akin to an appeal or termination; lack of organizational structure and use of paragraphs; small number of

connectors; short sentences; use of expressions and structures more typical of speech; and inclusion of non-arguments such as narration.

When comparing the written persuasive skills of 9 and 11 year olds, Knudson (1992) also found that younger writers tended to make fewer claims, provide less data to support claims and provide fewer warrants and propositions. As children progress through to adolescence their use of functional persuasive strategies increases including total number of arguments and use of more diversified messages (Clark & Delia, 1976). Crowhurst (1990) also supported the notion that there is improvement from the early school years into upper secondary level but that performance at these higher levels remains relatively poor.

During adolescence, a number of persuasive skills develop on a continuum toward more adult like presentations, for example acting more strategically within persuasive argument (Felton, 2004). Older students tend to elaborate ideas, demonstrate increased use of conjunctions, and display increased syntactic complexity beyond that found in narrative or description (Crowhurst, 1990). Nippold (1998) related that as children mature their persuasive strategies become more sophisticated and adjusted to the needs and characteristics of the listener. For example, stating advantages to a listener as a reason to comply. However, there continues to be inconsistencies in ability even within the adolescent group. In comparing adult with adolescent performance on a series of spoken dialogues based on controversial topics, Felton and Kuhn (2001) reported that teens did not act in a strategic manner in relation to the goals of the argument as they were more preoccupied with simply producing the dialogue. They were also not able to adapt to discourse requirements dependent on context i.e. if they were agreeing or disagreeing with a partner.

A study that spanned over all age groups and strongly supported the developmental nature of persuasive abilities from childhood to adulthood was conducted by Nippold and colleagues (2005) and involved a written essay task dealing with the topic of training animals to perform in circuses. The authors evaluated syntactic, semantic and pragmatic abilities across three age groups: children aged 11 years, adolescents aged 17 years and adults aged 24 years. The outcomes of the study evidenced the evolution of syntactic complexity, use of adverbial conjuncts, abstract nouns and metaverbs with age. There were two major findings within the pragmatics domain of note, which supported prior lines of research in the field. There was an increase in the total number of reasons across age groups with the adults almost doubling the number of reasons presented compared with the children and adolescents. There was significantly less difference between the children and adolescents on this measure. Older writers were more flexible in their attitudes on the topic than the other two groups, although all groups demonstrated a degree of flexibility in their arguments and not all adults reached this level of perspective taking.

#### 1.1.1.3 *Typical Problems in Persuasive Discourse*

Not surprisingly, several common problems occur for normally developing students in the area of written persuasive discourse and deficits in this area may lead to frustration and low-self esteem (Nippold, 1998). Typical problems include poor organization of information, immature language (Crowhurst, 1990), inadequate content and stylistic inappropriateness as well as weakness in providing supporting information or proof for reasons, building an elaborated argument and tying this information together in a conclusion (Knudson, 1992; Crowhurst, 1990; Felton &

Herko, 2004). Most significantly, problems with an overall lack of inclusion of opposition or response to opposition in the construction of an argument across all age groups are prevalent (Crowhurst, 1990; Knudson, 1992; Felton, 2001; Felton & Herko, 2004).

#### *1.1.1.4 Hypotheses for Problems in Persuasive Discourse*

Many compelling hypotheses have been put forward as to why these types of problems occur in student's persuasive writing. Experiential reasons include a lack of practice with argument writing and a lack of understanding of audience resulting in difficulty knowing how to appeal to various audiences (Knudson, 1992). The nature of the task may also be a factor, specifically those where a topic is assigned to a writer, which may or may not restrict the generation of content and use of specific vocabulary (Crowhurst, 1990).

More closely linked with the interaction of cognitive processes is the notion that students lack an appropriate discourse schema for argument (Knudson, 1992) and that the organizational features of argument are much more difficult to construct compared with the chronological ordering of narrative (Crowhurst, 1990). Within persuasive discourse, students cannot rely on knowledge telling as in narrative and exposition, but rather they must translate an internal dialogue that anticipates in advance possible objections and counterarguments from the audience (Felton & Herko, 2004). Without a conversational partner providing necessary prompts and cues for possible lines of argument and counter argument the task is made all the more difficult (Nippold et al., 2005, Knudson, 1992). It has been proposed that older children and adolescents have more conversational experience and therefore have internalized the turn taking cues

necessary for generating more comprehensive arguments, hence better performance on persuasive discourse tasks (Knudson, 1992).

Finally, it has been suggested that students may believe that by presenting counter arguments they will ultimately weaken their original argument (Nussbaum & Kardash, 2005).

#### 1.1.1.5 *Strategies to Enhance Persuasive Discourse*

Recommendations have been made throughout the literature on possible practices and strategies to enhance persuasive skills at all age levels. Felton (2004) suggested the combination of regular practice in spoken argument with reflection on the content of the argument through reviewing transcripts of the dialogue was more beneficial than practice alone. Nippold et al. (2005) reinforced the importance of collaborative instruction for students between teachers and speech language therapists, professionals skilled in the syntactic, semantic and pragmatic aspects of the genre.

The use of standard and elaborated persuasive goal instructions in preparing students for the task has received attention in the literature also. Ferretti, MacArthur and Dowdy (2000) measured the effect of providing elaborated goal direction to the task of writing a persuasive letter in students aged 10 and 12 years. Elaborated goal instructions, which included direction to produce a statement of belief, two to three reasons for the belief, examples or supporting information for each reason, two to three reasons why others might disagree and why those reasons were wrong, improved 12 year old writers, that is their letters were more persuasive overall and consisted of a greater number of argument elements. Interestingly, elaborated goal instructions did not improve the writing of the younger participants further

strengthening the premise that persuasive abilities are built on developing cognitive processes and are an age related progression.

Nussbaum and Kardash (2005) further developed the work of Ferretti et al. (2000) with college-aged students and specifically around the production of counter arguments during writing. They reported the use of specific goal instruction on including counter argument and rebuttal resulted in significantly more counter claims, rebuttals and reasons for rebuttals than the age matched peer condition. This finding reiterated the benefits of using specific goal instructions for all ages and not just to help compensate for lack of self-regulation in younger writers. Even at the age of college entry, spontaneous production of counter arguments where no direct instruction was given was relatively low, approximately one per paper.

#### 1.1.2 Persuasive Discourse in Clinical Populations

Students with learning disabilities have been found to produce less persuasive writing than their peers (Ferretti et al., 2000). In their study comparing typically developing (TD) children and children with learning disabilities (LD) the authors found the most significant difference between groups to be the number of reasons they produced (47% of LDs included at least two reasons versus 71% of TD) and the number of elaborations on a reason (37% of LDs provided at least three elaborations versus 74% of TD). Encouragingly, the elaborated goal condition, providing clear instructions on how to structure the argument, improved the LDs overall persuasiveness and total number of elements of argument. However, LDs were still less likely to include alternate view points overall.

Mason and Cramer (2008) suggested that children with learning disabilities have difficulty accessing and coordinating the multiple mental processes needed to develop

argument and as such, the use of self-regulation strategies that support self instruction, goal setting, self monitoring and self reinforcement are highly recommended in this group. Conceptually, these are strategies to help manage the information flow and provide a framework for such children to hang content on. Such approaches have been found to improve quality, number of essay elements and length of writing. One such strategy is the TREE model (Topic Sentence, Reasons, Examine audience perspective, Ending), which has proven successful in children with learning disabilities considering their audience and producing counter argument (Feretti, Andrews-Weckerly & Lewis, 2007).

### 1.1.3 Sampling, Scoring and Analysis of Persuasive Discourse

Snow and Douglas (2000) highlighted a number of methodological and conceptual considerations that need to be made when using discourse analysis to evaluate the communication skills of people with TBI. These included how the sample is elicited and how the sample is measured and analysed.

#### 1.1.3.1 *Eliciting Samples*

##### Topics

Topics for written persuasion tasks typically involve controversial issues and are usually on subjects relevant to the age group completing the task e.g. convincing parent to allow child to have sleep over for birthday in younger children aged 7 – 14 years (Clark & Delia, 1976) compared with homework and violence on TV (Feretti et al., 2000) for middle school children and issues of the death penalty in dialogues between older adolescents and adults (Felton & Kuhn, 2004). The topic of whether circuses with trained animals should be allowed to perform for the public was used to

span across all age groups (Nippold et al., 2005). The majority of authors cited that motivation toward the topic is important in eliciting best performance with a number of studies including topics regarding animal welfare; found to be of high importance to children and young people (Clark & Delia, 1976; Nippold et al., 2005; Crammond, 1998).

### Instructions

As earlier discussed, authors Ferretti et al. (2000) and Nussbaum & Kardash (2005) reported the benefits of using elaborated goal instructions in preparing students for a written persuasive task. These ranged from a general persuasive instruction (e.g. “I want you to take a position and write a letter to get someone to agree with you”) to an elaborated instruction, which involved the general instruction, as well as sub goals based on specific elements of persuasive discourse. The use of introductory texts to precede written persuasion tasks have also been adopted (Nussbaum & Kardash, 2005; Nippold et al., 2005; Crammond, 1998). Nippold et al., (2005) and Crammond (1998) outlined different reasons for and against their topics relating to animal welfare and prompted participants to consider their own views on the subject to assist students in considering differing points of view and produce more complete arguments.

As a test condition, this strategy has been found to positively enhance the writing of students who do not already possess extreme prior attitudes on a given topic and did not result in students simply repeating back those arguments detailed in the text (Nussbaum & Kardash, 2005).

### Pictorial Supports

Studies have also used pictorial supports in assisting students to produce more complete persuasive arguments by way of photo montages (Nippold et al., 2005;

Crammond, 1998). Crammond (1998) cited the use of picture supports as a means of helping to control for reduced topic knowledge. Reduced topic knowledge can effectively limit a participants development of essential argument structures therefore pictures have been used to help elicit best performance.

#### 1.1.3.2 *Measures*

Measures in persuasive discourse have been typically used for two purposes: to describe argument features and persuasive abilities, and to differentiate abilities between age groups (Crammond, 1999). This has typically been done through measures of essential argument and measurements of overall persuasiveness or a combination of the two (Ferretti et al., 2000; Knudson, 1992). While most studies have not considered language features, some have measured semantics and language productivity and complexity (Nippold et al., 2005).

Measures of essential argument have typically included similar features with different studies expanding or narrowing on the central theme of evidence of a claim, reasons to support the claim and a concluding statement (Hutson-Nechkash 2004). Ferretti et al. (2000) extended this in their scoring criteria to include propositions, reasons for propositions, elaborations on propositions, alternative propositions, reasons for alternative propositions, rebuttals and concluding statements. They also included scoring of non-functional elements or irrelevancies such as those statements deemed to be not related to the topic or contributing to the argument. It is worth noting that different criteria use different terms to describe the same argument structures. For example the criteria used by Knudson (1992) involved an adaptation of Toumlin's argument criteria which measured elements of claims (reasons), data

(elaborations), warrants (links between data to claim), propositions (claim), opposition (counter argument) and response to oppositions (rebuttal).

In addition to essential argument, studies have also used a holistic measure of overall persuasiveness (Knudson, 1992; Ferretti et al., 2000). These have typically involved a scoring rubric developed on a scale of increasing persuasive competence. For example, Knudson (1992) considered a rating of 1 to reflect a written composition that only attempted to address the topic, was vague, lacked fluency and presence of reasons for the opinion and contained numerous errors. Comparatively, a rating of 6 reflected a composition that addressed the topic through elaborated argument, demonstrated logical thought and was considered to be outstanding.

In an attempt to address the impact of pre-existing attitudes on a given topic on a participant's ability to develop argument Nussbaum and Kardash (2005) included a survey of attitude toward the topic to determine their views and the strength of these views.

In contemplating the various methods of measuring persuasive discourse it is important to consider a combination of measures that are able to incorporate a wide variety of responses. The use of additional strategies such as elaborated instructions, introductory texts and pictorial supports are also warranted.

### Summary

Persuasion is a challenging genre for all age group with skills continuing to develop into early adulthood. Studies have indicated variation in abilities within age groups of typically developing children and adolescents. Essential skills of persuasion involve intact spoken and written language, the ability to structure an argument and to consider another's point of view. Considering the collection of skills

required for proficiency it is conceivable that adolescents who have sustained a traumatic brain injury will demonstrate difficulties in this genre. Gaining a picture of language performance across other genres and modalities is useful in determining the potential of performance of adolescents with TBI in persuasion.

## **1.2 Discourse Impairment in Children and Adolescents with TBI**

Children and adolescents have been found to present with persisting language deficits following TBI (Anderson & Catroppa, 2004) with comprehension and expressive problems reported both at the lexical and discourse level (Ewing-Cobbs & Barnes, 2002). However, children and adolescents with TBI are often reported to present within normal limits on standardised language assessments (Chapman, 1997). It appears that such standardised and discrete measures are not sensitive enough to evaluate central language issues of children and adolescents with TBI that have largely been associated with more complex language processes such as social judgement, executive skills, conceptual skills, abstract thought and speed and ability to mentally organise responses (Anderson & Catroppa, 2004). Measures of discourse have been reported to be more sensitive to the effects of TBI as outcome measures than traditional or standardized speech language therapy assessments and are recommended in the evaluation of communicative competence for children and adolescents (Scott & Windsor, 2000; Chapman, 1997).

To date, the majority of research into discourse production in children and adolescents with TBI has focused on the spoken modality (e.g. Brookshire et al., 2000) and therefore it is useful to initially examine typical outcomes in this domain for gathering a picture of discourse deficits in children and adolescents.

### 1.2.1 Spoken Discourse

Different genres are thought to be more complex than others. For example, conversation is thought to be easier than narrative and exposition due to the minimal responses required in keeping it going versus the need to manage extended amounts of language (Biddle, McCabe & Bliss, 1996). As such of all the typical genres adopted by children and adolescents studies into verbal discourse following TBI have tended to focus on the monologic form of narrative and to lesser extent expository (e.g., procedural) and picture description (Coelho et al., 2005).

#### 1.2.1.1 *Narrative Discourse*

Narrative discourse sampling typically involves the generation of an original story (Biddle et al., 1996) or the retelling of an auditory story with or without picture supports (Chapman, Levin, Wanek, Weyrauch & Kufera, 1998). Within the narrative genre, children and adolescents with TBI have been found to present with deficits predominantly in the domains of content and information. (Brookshire et al., 2000; Chapman et al., 1992; Chapman, 1997), complexity of language (Brookshire et al., 2000) and language productivity (Brookshire et al., 2000; Riley, Bates & Marchman, 1998; Ewing-Cobbs & Barnes, 2002). However, performance outcomes have been variable across studies.

Content and information has typically been measured by the number of core propositions including essential story information and gist, that is the set of most central propositions to the story. Episodic structures that define and sequence order of events are also key measures (Brookshire et al., 2000). A number of studies have

evidenced deficits in children and adolescents with TBI on these measures compared with peer groups and across severity of injury groups (Brookshire et al., 2000; Chapman et al., 1992; Chapman, 1997). The predominant feature is an overall reduction in story content and impairment in organising story structure. (Brookshire et al., 2000; Chapman et al., 1998; Ewing-Cobbs & Barnes, 2002). To illustrate, Chapman et al. (1998) compared performances of children with TBI to their age matched peers on two narrative tasks involving a retell of an Aesop's fable and generation of a story based on a five picture card sequence. Each story contained 16 propositions, had distinctive episodes and similar macrostructure or gist components. Results indicated highly significant differences between groups on measures of information with the TBI group producing less information, omitting essential story components and global story content as well as disruptions to story structure. Interestingly, measures of language (e.g. number of words, number of T-units and number of dependent clauses) failed to reach significance in group comparisons. A number of other studies have also evidenced disruptions in information and content in the face of other preserved language features, such as syntactic complexity (Chapman, 1997; Chapman et al., 1992; Ewing-Cobbs & Barnes, 2002). However, there is also evidence to support a reduction in syntactic complexity in children with TBI within narrative discourse. Syntactic complexity is typically measured by calculating the mean number of words in a sentence and the number of dependent clauses in a sentence, termed clause density (Scott & Stokes, 1995). Brookshire et al., (2000) found children with severe TBI produced fewer total words and fewer complex sentences on a narrative retell task compared with a mild TBI group. Reilly et al. (1998) also reported impaired sentence complexity in a group of children with TBI on

a narrative retell task and indicated a possible relationship between complex sentence production and site of lesion (e.g., left vs. right hemisphere).

The area of language productivity has also yielded mixed findings. Measures of productivity typically include calculating the number of total words and number of T-units. Chapman et al., (2001) reported that children with severe TBI produced significantly less language as measured by number of T-units than mild or moderately injured groups. Comparatively, Biddle, McAbe and Bliss (1996) reported that children with TBI produced almost an equal number of propositions on a generative narrative task compared to their age matched peers. These examples warrant the need for continued investigation into language productivity in discourse with consideration of other factors such as task type (e.g., retell vs. generative), comparison groups and severity of injury.

#### 1.2.1.2 *Expository Discourse*

As described previously, different discourse genres are considered easier or more difficult than others and greater discourse impairments have been reported in the expository genre compared with narrative in typically developing and TBI populations (Hay & Moran, 2005; Scott & Windsor, 2000). Expository discourse explains or describes a topic and information is logically orientated around a theme. As such it is more closely aligned with academic achievement than narrative and becomes the major discourse in which teachers assess student's understanding of the curriculum (Hutson-Nechkash, 2004).

In a comparison study of narrative and expository, specifically procedural discourse, Hay and Moran (2005) found significant differences in performance of adolescents with TBI on measures of language (e.g. number of words, number of T-

units, sentence complexity) and information (e.g. number of propositions, episodic structure) and pragmatics (e.g. generation of story moral or aim) compared with their age matched peers on both narrative and expository tasks, with both groups performing better overall on the narrative tasks compared with expository.

### 1.2.1.3 *Long Term Outcomes*

The evident disruption of language skills following childhood TBI in contextual and functional uses of language as measured in narrative and expository discourse sampling is of concern. Furthermore, discourse impairments are also reported to persist well beyond the immediate injury recovery period (Brookshire et al., 2000; Chapman et al., 2001). A three-year follow up of children's verbal discourse skills on a narrative retell task found that children with severe TBI performed consistently and significantly worse on all measures including amount of language, amount of information, organization of information and story lesson compared with the mild-moderate group. Encouragingly, in regards to productivity there was a general trend of improvement across time in all groups with the severe group demonstrating the biggest rate of change in the first year of recovery (Chapman et al., 2001). This reinforces the notion that despite sustaining a brain injury in early childhood, discourse deficits can persist into adolescents and beyond and need to be considered in older children as well.

### Summary

Spoken discourse production is disrupted in children and adolescents following TBI with deficits occurring in the domains of information, language complexity, productivity and pragmatics. While performance on measures of

discourse have been found to vary across studies it is collectively agreed that this population presents with difficulty verbally organising and constructing language for functional tasks such as narration and explanation.

Individuals with TBI have also been found to present with deficits on written discourse tasks (Wilson & Proctor, 2000; Wilson & Proctor, 2002; Mortensen, 2005) and it is useful to review the nature of these deficits alongside typical written language development in preparation for considering adolescents with TBI's performance in written persuasion.

## 1.2.2 Written Discourse

### 1.2.2.1 *Typical Development*

The development of written discourse is reflected in the function or genre that the writing serves with the four major writing genres involving narration, description, persuasion and expository (Rubin, 1984). On a developmental continuum children tend to move from an established proficiency in spontaneous spoken language and writing as they speak (e.g., narration) through to more advanced written exposition that considers the impact of the text on the audience (e.g., persuasion), (Danielewicz, 1984; Rubin, 1984; Hutson-Nechkash, 2004).

In order to make this transition, children and adolescents require proficiency in a number of skills that logically increase with age. Expository writing is thought to emerge at eight years of age and continue to increase in complexity and formality and becomes the major means of assessing a child's understanding of the curriculum. From this time, productivity (e.g., total words, total number of ideas) increases with age and children's utterances generally become longer and more highly subordinated (Puranik, Lombardino & Altman, 2008; Scott & Stokes, 1995). The development and

selection of syntactic elements have also been associated with discourse genre (Collins, 1984; Scott & Stokes, 1995). In regards to structure, students are required to construct lengthy informational reports using topic sentences, paragraphs, summaries and conclusions. Vocabulary becomes richer in quality with the increased use of figurative language, abstraction, differing writing styles and voice (Hutson-Nechkash, 2004; Nippold, 1998).

In comparison with spoken discourse, the written modality presents several challenges. Primarily the writer must sustain the purpose of their writing and thinking on the topic for the duration of the discourse (Beach & Bridwell, 1984). There is no immediate audience with whom to explain or repair problems of clarity with and therefore the burden of conveying the whole message is reliant on the written word (Beach & Bridwell, 1984; Yorkston, Jaffe, Polissar, Liao & Fay, 1997). Due to this, frequency of errors (e.g., false starts, revisions, incomplete utterances) are less allowable and the ability to inhibit such errors requires increased cognitive planning and online processing (Yorkston et al., 1997).

#### 1.2.2.2 *TBI Population*

In view of the complex cognitive, language and motor skills required for proficiency in written language it is understandable that children and adolescents with TBI differ on measures of written discourse production compared to their age matched peers. Though few in number, studies into written discourse in children and adolescents with TBI have provided useful information in better understanding the written language characteristics of this population.

Wilson and Proctor (2002) investigated the written discourse abilities of adolescents with and without TBI on a picture description task. While measures of

productivity were similar for the groups i.e. number of communication units, the adolescents with TBI used fewer words per communication unit to express their ideas. Further, the local coherence of the text was rated as significantly lower than age matched peers indicating reduced connectedness of expressed ideas. Interestingly, the impact of cognitive distance did not impact on the measures, that is, adolescents with TBI did not use more words with less connectedness in the second half of their written descriptions (Wilson, Smith & Proctor, 2001). Written local coherence has also been found to be impaired in the adult TBI population on a letter-writing task (Mortensen, 2005).

Yorkston et al., (1997) found at one-month post injury, children with TBI differed from their peers on a task also involving producing a written story based on a picture. Children with TBI differed most significantly on measures of efficiency (words per minute and T-units per minute) and completeness (number of words, number of T-units and thematic maturity or story elements). Aspects of completeness were most strongly correlated with neuropsychological test scores including adaptive problem solving (executive and metacognitive routines), verbal and performance intellectual skills, memory, motor speed and dexterity. As within the spoken modality vocabulary was least susceptible to change (Ewing-Cobbs & Barnes, 2002). Notably, in a follow up study at one-year post injury the authors identified that while there was some improvement in the various written language domains, the severe group's deficits had not resolved (Yorkston, Jaffe, Liao & Polissar, 1999).

Wilson and Proctor (2000) also concluded that the non-significant differences between group measures in their study of written productivity, written efficiency and use of lexical ties were more closely associated with measures of working memory and executive functioning than participant group membership.

A number of studies have given indications as to why children with TBI may differ on discourse measures and many have made links between cognitive factors and performance.

### **1.3 Cognition and Discourse**

Essential cognitive functions such as attention, memory and executive functioning are frequently disrupted following TBI in children and adolescents. (Mateer, Kerns & Eso, 1996). Such impairments have been found to negatively impact on related language skills such as organising and sequencing thoughts for discourse production (Youse & Coelho, 2005). A number of authors have investigated the correlation between neuropsychological functioning and discourse production and found strong relationships between competence in discourse and working memory (Hay & Moran, 2005; Ewing-Cobbs & Barnes, 2002; Brookshire et al., 2000) and executive functioning (Brookshire et al., 2000; Chapman, 1997).

#### **1.3.1 Working Memory**

Baddeley (1992) defined working memory as a brain system that provides temporary storage and manipulation of information necessary for such complex cognitive tasks as language comprehension, learning, and reasoning.

He proposed a working memory model that extends beyond the storage role and involves a central executive (supervisory role) responsible for the allocation of attention and processing resources. Coordination of these resources is considered to be the leading function of working memory. As expected novel and complex tasks require greater control and integration of resources reducing the overall capacity for either storage or processing.

Working memory has been found to be a central function in written language. Swanson and Berninger (1996) found significant correlations between writing measures most closely associated with text generation and working memory. The authors suggested that specific writing functions such as idea generation, translation of ideas into words, creation of sentences and discourse structures and editing all strain a writer's working memory resource. With limited capacity, the writer then has difficulty juggling the multiple goals associated with the task. Swanson and Berninger (1996) gave the example of a writer whose memory was overloaded while simultaneously planning and organizing information for production, editing and spelling, attempting to keep the audience in mind and maintaining genre. Effectively compromising the whole writing process.

### 1.3.2 Executive Functioning

Executive functioning is defined as the integration and regulation of a number of cognitive systems including attention, memory, social behaviour and comprehension relevant to goal directed behaviour. Executive functioning is necessary for an individual to form goals, initiate behaviour, anticipate consequences or actions, plan and organize behaviour, monitor and adapt behaviour to fit particular tasks (Cicerone et al., 2005; Kennedy et al., in press). Skills are thought to emerge in the first year of life and develop well into adolescence and early adulthood (Anderson & Catroppa, 2005).

In regards to written language, the demands of the task seek to challenge the interaction between executive functions responsible for facilitating organization of information, memory and associated language for the topic and attention to the task (Yorkston et al., 1997). Thus, it is conceivable that when this executive supervisory

system is disrupted, as with adolescents with TBI, discourse production in the written modality will be affected. A number of authors consider the writing process as a goal oriented behaviour (e.g. Ferretti et al., 2000). As such, the individual with TBI is less likely to be able to formulate a writing goal and appropriate plan and execute that plan while continuously evaluating their performance e.g. remaining on topic, considering all elements of essential information, structuring information appropriately and accessing language due to disruption to the executive system. Ferretti et al., (2001) queried whether younger students, burdened with the task of writing, were unable to integrate all the elements of a composition due to executive capacity demands. The consideration of executive functioning capacity and demands are paramount when interpreting the written discourse of adolescents with TBI.

The evaluation of underlying cognitive processes relative to discourse production such as working memory and executive function is advocated and interaction between cognition, language and modality cannot be overlooked when interpreting performance of children and adolescents with TBI in spoken and written discourse. Proficiency in persuasive discourse has been demonstrated to rely on developing cognitive abilities such as flexibility in thought and social perspective taking. As the development of persuasion starts to mature in adolescents this is an important time of life to evaluate performance.

#### **1.4 Adolescents with TBI and Persuasive Discourse**

Adolescence is a time of significant social development. From pre-adolescence (9-12 years) through to older adolescence (17 years +) a number of developmental changes take place with regard to construction of self-identity including development of independent values, morals and opinions (Turkstra, 2000).

Using a variety of ecological data collection methods including focus groups and observation Turkstra (2000) compiled a list of skills considered to be required for social acceptance in this age group. Of significance to the applications of persuasive discourse were the traits of being able to understand another person's point of view and the ability to be flexible. Within adolescent conversation interactions, speaker characteristics included asking questions and seeking opinions of others (e.g., What do you think of X?). In summarizing the study, the author stated that communication was not only the means for conveying information but also provided the medium for developing social skills.

Viewing persuasive discourse as a means to develop one's sense of identity through communicating opinions, ideas and beliefs signals this genre as vitally important in the adolescent years. Given the challenges faced by adolescents with TBI the more that is known about their ability to perform in this genre the better equipped clinicians and educators will be in assisting them to reach their social communicative potential.

### **1.5 Summary and Thesis Aims**

The majority of research in the area of discourse impairment in adolescents with TBI has focussed predominately on the monologic spoken form in narrative, descriptive and procedural genres (Coelho et al., 2005). To date there has been no attention given to the persuasive genre in this population. Development of persuasive writing abilities mature in adolescence and surpass narrative in the complexity of language produced and higher order cognitive and language skills required for proficiency. Persuasive writing abilities are formally assessed in New Zealand during

the later secondary school years and are an essential component of the New Zealand English curriculum.

A greater understanding of the effects of TBI on student's abilities in this critical time of socialisation and education is needed within language and pragmatic (argument) domains. The general aims of this thesis are to evaluate the written persuasive discourse abilities of adolescents with TBI to assist with informing clinical practice and education planning for this population. Two major questions have arisen based on the relevant literature:

1. Will the TBI group differ on measures of language and pragmatics compared to their age matched peers?
2. Which measures, if any will differentiate the groups?

Based on the presented research it is hypothesised that:

- a. Adolescents with TBI will demonstrate decreased performance on a persuasive writing task compared with their age-matched peers who have not sustained a brain injury.
- b. Adolescents with TBI will demonstrate decreased performance on measures of language productivity i.e. the TBI group will produce less writing than their age matched peers and language complexity i.e. the TBI group will produce less complex language compared with their age matched peers.
- c. Adolescents with TBI will demonstrate decreased performance on measures of pragmatics (essential argument) compared with their age-matched peers.

## CHAPTER 2

### METHOD

#### 2.1 Participants

The participants (N = 18) included nine adolescents with brain injury (age range = 11 years 7 months to 17 years 5 months; mean age = 14 years 7 months) and nine age, gender and education matched peers without brain injury (age range = 11 years 7 months to 17 years 11 months; mean age = 14 years 8 months). All participants were monolingual English speakers, attended intermediate or secondary school education institutions and were placed in years seven to thirteen. Participants were recruited from the Central Otago, Southland and Timaru areas and ranged in socio-economic status.

##### 2.1.1 Adolescents with Traumatic Brain Injury

The participants with acquired brain injury were recruited from the author's existing and previous speech language therapy clinical caseload and deemed to be brain injured if they had a claim accepted by the Accident Compensation Corporation of New Zealand. The participants sustained their injuries a minimum of 24 months prior to the administration of the persuasive discourse measures. Severity levels of injuries were unable to be obtained for all participants and therefore have not been reported. All participants had previously received speech language therapy for specific language, literacy and/or cognitive-communication impairments as a result of their

injury; though only four were receiving intervention at the time of the study. Eight of the nine participants were supported at school by a teacher's aide.

Table 1

*Participant Demographics*

Participant	Sex	Age at	Age at		Educational	Mechanism
		injury	TBI	C		
1	M	1:4	11:7	11:7	Year 7	Fall
2	M	3:4	12:8	12:6	Year 8	Collision
3	M	7:4	14:4	14:4	Year 9	Fall
4	M	5:6	14:6	14:6	Year 9	Fall
5	F	2:7	14:11	14:9	Year 10	MVA
6	M	7:6	15:1	15:2	Year 10	Car V Ped
7	M	8:8	16:1	16:1	Year 11	Med Mishap
8	F	14:2	16:4	16:6	Year 11	Fall
9	M	5:7	17:5	17:11	Year 13	Bike v Car

*Note.* M=Male; F= Female; MVA = Motor Vehicle Accident; Ped = Pedestrian.

### 2.1.2 Age Matched Peers

Once the participants with brain injury had been identified, typically developing participants were recruited to match to the adolescents with brain injury based on gender, age (</>6 months) and educational level. Students in the age-matched peer group were all recruited from one high school in the Wanaka area and were selected from an initial pool of students put forward by the school's special

needs coordinator. Students in the initial pool were recommended because they were deemed to have no existing learning or language problems and would be willing participants in the project. Age matched peers were then selected based on their willingness to participate. All participants in this group performed within normal limits on standardised language tests.

### 2.1.3 Exclusions/Inclusions

In both groups, any student with a hearing or visual impairment were excluded and English as a first language was a pre-requisite for inclusion in the study.

## 2.2 **Procedures**

All sessions followed the same format. Following a brief introduction and explanation of the session, ancillary testing commenced followed by a 10-minute break before the persuasive discourse task was administered. Sessions lasted approximately one hour and fifteen minutes to two hours and breaks were offered throughout the session to help minimize the effects of fatigue. Sessions were conducted at the participant's school or home (all of the age matched peers were seen at school and six of the nine students with TBI were seen at home) in a quiet room with minimal distraction. Participants were offered the option of having a significant other present and one of the nine students with TBI opted for this.

### 2.2.1 Ancillary Testing

Three measures were taken prior to commencing the persuasive discourse task: a working memory measure (Competing Language Processing Test - CLPT), an expressive and receptive language measure (Clinical Evaluation of Language

Fundamentals – 4) and a written language measure (Test of Adolescent and Adult Language – 3).

*Competing Language Processing Test (CLPT)*

The CLPT (Gaulin & Campbell, 1994) is a dual processing and storage task used to evaluate working memory in children. Participants were required to listen to groups of sentences increasing in number from two to six. They were instructed to answer true or false after each sentence (processing component) and then to repeat the last word of each sentence once the whole group had been read aloud (storage component). The percentage correct of true/false responses and words recalled were recorded.

*Clinical Evaluation of Language Fundamentals – 4 (CELF-4)*

The CELF-4 (Semel, Wiig & Secord, 2003) consists of a range of expressive language, receptive language, memory, phonological awareness and pragmatic subtests. For the purpose of the current study, the core language subtests were used to elicit a combined language score for each participant. Selection of subtests was based on participant age and as per the guidelines set out in the assessment manual. These included: concepts and following directions, recalling sentences, formulated sentences, word classes (total), and word definitions. Raw scores were obtained and translated into standard scores and a core language score.

*Test of Adolescent and Adult Language 3 (TOAL-3)*

Two subtests from the TOAL-3 (Hammill, Brown, Larsen & Wiederholt, 1994) were administered to all participants. These were writing vocabulary (WV) and

writing grammar (WG). The writing vocabulary sub test required the participant to write a series of complete sentences given a specific word e.g. brilliant, furrow. The writing grammar subtest required the participant to read two to six sentences and combine these into one sentence e.g. Linda likes cake/Linda likes candy would be written Linda likes cake and candy.

Table 2

*Performance of Participants on Ancillary Testing*

Participant	CELF-4		TOAL-3 WV		TOAL-3 WG		CLPT	
	TBI	C	TBI	C	TBI	C	TBI	C
1	102	120	5	13	5	13	25	31
2	90	124	4	10	1	8	27	27
3	79	134	1	15	6	15	22	33
4	87	114	1	12	3	9	26	28
5	115	126	8	15	7	14	28	28
6	87	108	1	14	5	14	27	29
7	87	129	6	11	10	14	20	28
8	117	130	12	14	13	16	29	24
9	102	117	8	13	14	12	22	29

*Note.* CELF-4 = Clinical Evaluation of Language Fundamentals 4 (results shown are core language scores); TOAL-3 = Test of Adolescent and Adult Language 3; WV = Writing Vocabulary; WG = Writing Grammar; CLPT = Competing Language Processing Test (results shown are number of words recalled); TBI = participant with traumatic brain injury; C = age matched peer participant.

Results of ancillary testing indicated significant differences between the TBI group and age matched peer group on all oral language, written language and working memory tests (CELF-4:  $t = -5.28$ ,  $p = 0.00019$ ; WV:  $t = -5.64$ ,  $p = 0.00015$ ; WG:  $t = -3.30$ ,  $p = 0.0029$ ; CLPT Word Recall:  $t = -2.59$ ,  $p = 0.010$ ).

### 2.2.2 Written Persuasive Discourse Task

Based on the procedures of Nippold, Ward-Lonergan and Fanning (2005), participants were asked to write an essay on the same topic. The topic was whether or not circuses with trained animals should be allowed to perform for the public or not. This was chosen because the task had previously been proven to elicit a wide range of responses from children and adolescents and used a topic related to animal welfare, a subject proven to be of importance to young people when generating persuasive writing (Crammond, 1998; Clark & Delia, 1976). Each participant was given lined paper and a pen to write their essay and was prompted to look at a photomontage depicting animals performing in a circus (See Appendix A). The examiner then read aloud an introductory passage to encourage the participants to consider all aspects of the topic:

*People have different views on animals performing in circuses. For example, some people think it is a **great idea** because it provides lots of entertainment for the public. Also, it gives parents and children something to do together, and the people that train the animals can make some money. However, other people think having animals in circuses is a **bad idea** because the animals are often locked in small cages and are not fed well. They also believe it is cruel to force a dog, tiger, or elephant to perform certain tricks that might be dangerous. I am interested in learning what **you** think about this controversy and whether or not **you** think circuses with trained animals*

*should be allowed to perform for the public. I would like you to spend the next 20 minutes writing an essay. Tell me exactly what you think about the controversy. Give me lots of good reasons for your opinion. Also, please use your best writing style, with correct grammar and spelling, and good handwriting. If you aren't sure how to spell a word, just take a guess. I will tell you when you have 5 minutes to go. Do you have any questions?*

### **2.3 Analysis**

Transcripts were keyboarded into electronic format by the main investigator with all of the participant's writing conventions retained (spelling, grammar, punctuation and spacing).

#### *Language Productivity*

A second investigator, blinded to participant group membership, divided each written sample into T-Units. For the purposes of this study, a T-Unit was defined as an independent clause with any associated dependent clauses. A third investigator checked the T-units to verify the manner in which they were divided. The level of agreement between both investigators was (96%). Any disagreement was then resolved through discussion to 100%. From this information, the first investigator was able to calculate measures of general productivity including number of T-Units, total words and mean length of utterance in words.

#### *Language Complexity*

Next each essay was coded by the second investigator so syntactic information could be identified. This included production of independent clauses and 3 types of

dependent clauses (nominal, adjectival and relative) as well as production of gerunds. In counting nominal clauses, different subject infinitival clauses were also analysed as nominal clauses (e.g., *So why is it allowed for [us to do it]?*). The third investigator completed an independent analysis of (20%) of the samples for reliability purposes. Agreement was reached on (92%) of the measures. Any disagreement was resolved through discussion until 100% agreement was reached. Samples were double checked for any errors and given to the main investigator for calculation of variables.

Table 3

*Written Persuasive Discourse Measures*

Language: Productivity	Number of T-Units	No T-Units
	Total Words	TW
	Mean Length of T-unit in Words <i>(Total Words/T-Units)</i>	MLTU-W
Language: Complexity	Total Number Clauses <i>(Ind + Dep + GER)</i>	TC
	Clause Density <i>(Ind + Dep / T-Units)</i>	CD
	Clause Type: <ul style="list-style-type: none"> <li>• Nominal</li> <li>• Relative</li> <li>• Adjectival</li> <li>• Gerund</li> </ul>	NOM RC AVC GER

Pragmatics	Claim	Claim
	Number of Reasons	R
	Number of Elaborations	E
	Conclusion	C
	Irrelevancies	IR
	Repetitions	REP
	Attitude	A

*Note.* *Ind* = Independent Clause; *Dep* = Dependent Clause; GER = Gerund.

### *Pragmatics*

Each original essay was examined for essential elements of argument including claim, number of reasons, number of elaborations on reasons, conclusion and attitude. Additional content measures of number of irrelevancies and number of repetitions of information were also coded (See Appendix B for pragmatic coding criteria guide). In order to reach agreement, the first and second investigators independently coded the samples then reached 100% agreement through discussion. Original samples were given to the third investigator for reliability purposes. The third investigator was trained in the coding procedure and coded all of the samples with the following levels of agreement reached: number of reasons (90.7%), number of elaborations (83.7%), number of irrelevancies (69%), conclusion (92%), number of repetitions (60%) and attitude (yes = 75%, no = 90%, mixed = 100%). Any disagreement was then resolved to 100% agreement through discussion.

#### 2.3.1 Statistical Analysis

Multiple T-test for unequal variances were performed for all of the language measures (total T-units, total words, mean length of T-unit, number of clauses and

clause complexity) except for clausal breakdown where an Analysis of Variance was conducted to determine whether any differences existed. Multiple T-test for unequal variances were also performed for all of the pragmatic measures (claim, number of reasons, number of elaborations, conclusion, number of repetitions of information and number of irrelevancies) except for attitude where scores were reported in number and percentage of each participant with each attitude (for, against or mixed).

## CHAPTER 3

### RESULTS

This study compared adolescents with TBI and their age matched peers on a written persuasive discourse task. The results showed that the groups did not differ significantly on any of the language measures but that groups did differ significantly on pragmatic measures of number of reasons, number of repetitions of information and attitude. The means, standard deviations and ranges for both groups on measures of language and pragmatics are presented in Tables 4 – 7.

#### 3.1 Language Measures

Samples were analysed for language measures including general productivity (total words, number of T-units and mean length of T-unit in words) and syntactic complexity (total number of clauses, clause density and clausal breakdown i.e. nominal, relative and adjectival as well as number of gerunds).

T-test for unequal variances were calculated for all the linguistic measures except clausal breakdown. There were no significant differences between groups on any of the measures. Table 4 displays the means, standard deviations and range for the following measures total words, total T-units, mean length of T-unit, total clauses and clause density.

Table 4

*Written persuasive discourse language measures (n = 9 per group)*

Language Measure	Mean	SD	Range	<i>t</i>	<i>p</i>
<b>Total Words</b>				-1.09	0.14
TBI	141.78	21.59	63-240		
Age matched peers	179.89	27.27	85-360		
<b>Total T-units</b>				-1.14	0.13
TBI	8.44	1.14	4-13		
Age matched peers	10.44	1.32	5-18		
<b>Mean Length of T-unit</b>				-0.34	0.37
TBI	16.70	2.93	12-21.7		
Age matched peers	17.17	2.95	12.57-20.85		
<b>Total Clauses</b>				-0.61	0.27
TBI	22.56	3.18	10-37		
Age matched peers	25.33	3.26	14-45		
<b>Clause Density</b>				0.12	0.45
TBI	2.20	0.37	1.4-2.6		
Age matched peers	2.18	0.51	1.4-3.14		

Note. SD = standard deviation; TBI = traumatic brain injury.

A two by three (group X condition) Analysis of Variance (ANOVA) was conducted to determine whether there were any differences in the number of different clauses used both within and between groups. It was revealed that there was a significant difference across condition for numbers of types of clauses used  $F(3, 64) = 3.29, p < .05$  but there were no differences between groups and no interaction effect.

Post-hoc t-tests revealed a significant difference in the number of relative clauses (mean = 2.06) used when compared to nominals (mean = 4.22) and adverbial clauses (mean = 4.67) with significantly fewer relative clauses being used. There were no other differences between clauses.

### **3.2 Pragmatic Measures**

Measures of essential argument including claim, number of reasons, number of elaborations of reasons and conclusion and additional measures of content including number of irrelevancies and number of repetitions of information were used to evaluate pragmatic performance. All participants provided a claim therefore this measure was not analysed statistically.

Multiple t-tests were conducted to determine whether differences existed between adolescents with TBI and age-matched peers. Significant differences were found for number of reasons ( $t = -1.84, p = 0.046$ ) and number of repetitions of information ( $t = 2.13, p = 0.028$ ) with individuals with TBI producing significantly fewer reasons and producing significantly more repetitions of information than their age matched peers. There were no significant differences on any other pragmatic measure. Table 6 displays the means, standard deviations and range for all pragmatic measures.

Table 6

*Written persuasive discourse pragmatic measures (n = 9 per group)*

Pragmatic measure	Mean	SD	Range	<i>t</i>	<i>p</i>
<b>Number of reasons</b>				-1.84	0.0465*
TBI	3.78	2.33	1 - 8		
Age matched peers	5.33	1.45	4 - 7		
<b>Number of elaborations</b>				0.00	0.50
TBI	2	1.94	0 - 6		
Age matched peers	2	2.29	0 - 6		
<b>Conclusion</b>				0.00	0.50
TBI	0.78	0.44	0 - 1		
Age matched peers	0.78	0.44	0 - 1		
<b>Number of repetitions</b>				2.13	0.0280*
TBI	1.00	1.00	0 - 3		
Age matched peers	0.22	0.44	0 - 1		
<b>Number of irrelevancies</b>				0.60	0.28
TBI	0.22	0.44	0 - 1		
Age matched peers	0.11	1.99	0 - 1		

Note. SD = standard deviation; TBI = traumatic brain injury; \*significant at <0.05

### 3.3 Non-Statistical Analysis

#### *Number of Reasons*

With regard to the number of reasons measure, the range of the TBI group compared to their age matched peers is worth noting. Using the methods and

reporting of Feretti et al., (2001) 66% of the TBI group produced at least 3 reasons compared with 100% of their age matched peers and 33% of the TBI group produced at least 5 reasons compared with 77% of their age matched peers.

### *Attitude*

Based on the reporting of Nippold et al., (2005) participant attitude was reported as number of participants for, against or with a mixed attitude toward the topic of whether circuses with trained animals should be allowed to perform for the public. The numbers and percentages of participants in each group with each attitude are presented in Table 7.

Table 7

#### *Participant Attitude* (n = 9 per group)

Participant group	For	Against	Mixed
TBI	3 (33.33)	6 (66.66)	0
Age Matched Peers	0	4 (44.44)	5 (55.55)

Note. Results shown as number and percentage of participants with each attitude

None of the TBI group adopted a mixed attitude toward the topic compared to 55 % of the age matched peer group.

### *Comparison with Normative Data*

When comparing the results of the adolescent groups in the current study (TBI group mean age = 14;7 [years; months], range 11;7 – 17; and age matched peer group mean age = 14;7, range 11;7 – 17;11), with the results from the typically developing children (mean age = 11;9, range 10;6 – 13;5) and adolescents (mean age = 17;3,

range 16;3 – 18;6), described by Nippold et al., (2005), some differences of note existed. The adolescent TBI group and their age matched peers produced fewer number of reasons (mean = 3.78 and 5.33 respectively) compared with the child group in the Nippold et al., (2005) study. The child group in the Nippold et al., (2005) study scored 6.80 for mean number of reasons (SD = 3.15). The TBI group was almost 1 SD below the mean compared to that group, despite being, on average, three years older.

Differences between studies were also identified with regard to total number of words. The TBI group produced a total number of words (  $m = 141.77$ , range = 63 – 240) more closely aligned with the typically developing child group (146.90, range 33 – 297) from the Nippold et al.,(2005) study and their age matched peers produced a total number of words (mean = 179.88, range 85 – 360) more closely aligned with the typically developing adolescent group (mean = 188.52, range 86 – 321) from the Nippold et al., (2005) study.

## CHAPTER 4

### DISCUSSION

The following primary questions were raised by this study (a) Do adolescents with TBI differ from typically developing age-matched peers on written persuasive discourse tasks? (b) Which, if any, measures of language and pragmatics differentiate the groups?

Adolescents with TBI were found to differ significantly in performance on a written persuasive task compared with their age matched peers on pragmatic measures of number of reasons provided to support the claim, repetitions of information and attitude. The groups did not differ significantly on measures of language including productivity and language complexity. These findings reflect similarities and differences with respect to previous research conducted in the area and are discussed below. Implications for clinical practice when working with adolescents with TBI are given along with recommendations for future research directions in persuasive discourse with this population.

#### **4.1 Group differences: Adolescents with TBI and age matched peers**

##### **4.1.1 Language outcomes**

An important finding of this study was that there were no significant differences between groups on measures of productivity or syntactic complexity. However, the TBI group consistently produced fewer words, fewer T-units, shorter utterances and fewer clauses than their peers indicating a degree of difference in their performances.

Previous studies into discourse following TBI have also evidenced inconsistencies in regard to syntactic complexity of language (Coelho et al., 2005;

Wilson & Proctor, 2002; Van Leer & Turkstra, 1999) reinforcing the notion that measurement and outcomes of contextual language production in this population are not as clear cut as assessors would like. It is possible that the persuasive task elicited more complex grammar than expected in the TBI group as it did on the same task in the child group from the Nippold et al. (2005) study. Typical development of persuasion sees an increase in the level of syntactic complexity in the adolescent years beyond that of narrative and description (Nippold, 1998; Crowhurst, 1990) indicating that the genre lends itself to more complex sentence construction. Persuasive discourse naturally calls for subordination (Rubin, 1984) in producing claims and reasons and provides a framework for more complex elements of syntax. The original prediction that the TBI group would produce less complex language compared to their peers based on the performance of this population on narrative and descriptive tasks was perhaps too generalised and predicted language features should be viewed based on genre in the future.

There appears to be more agreement in the TBI literature on information and content measures of verbal output, efficiency of discourse and coherence (Coelho et al., 2005). In measures of productivity (total words, total T-units), the current study evidenced a difference between groups but this was not significant. In one of the few studies evaluating adolescent TBI written discourse, Wilson and Proctor (2002) reported a similar outcome.

While the current results can be viewed as encouraging for the students with TBI, speech language therapists know anecdotally that this group have problems in the area of written language. Moreover, the students with TBI in the current study performed much more poorly on the written language ancillary testing measures than did their peers (see Table 2). In this instance, the TBI group appeared better able to

'use' their below average written language skills in vocabulary and grammar to perform at a level not significantly different from their peers. This compares to previous reports of children with TBI performing within normal limits on standardised language assessments but demonstrating deficits at the contextual discourse level, effectively not being able to put their language skills into practice. One explanation for the TBI group's performance is that the language measures were not sensitive enough to capture the subtle discourse behaviours that affected the face value quality of the writing (see Table 8).

Snow and Douglas (2000) contemplated similar questions when reviewing methodological and conceptual issues in discourse with the TBI population. The authors recognised that researchers and clinicians typically measure behaviours that can be easily counted and are quantitative by nature but that the actual behaviours which are damaging to the interaction are usually much more difficult to objectively define and measure. When the trained speech language therapist looks at the samples they are able to see differences, but these differences are difficult to quantify. It appears that more sensitive, qualitative measures may be required. One area that could have been easily measured objectively was writing conventions such as spelling and punctuation. While, these problems would have occurred regardless of genre, within the persuasive genre such errors could serve to weaken the argument of the writer as reader fluency is disrupted by struggling to interpret the information and the impact is lost.

Table 8

*Examples of Written Persuasive Essay*

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*Written Persuasive Sample for male with TBI aged 14 years 6 months*

Furcing amiles to do something ia cruleg. Riding a motorbike this is Dangries because it is putting the amile and others at risk. If the amile is ingered then they might have to be put down. tranging amiles to be in a curcles is crule to. So never trang aamles to be in a curcles and putting their life or yours at risc.

*Written Persuasive Sample for age, gender and education matched peer (14;6)*

I'm writing this essay to try and convince you that trained animals should not be performed in public.

My reasons for this is because its cruelty to the animals forcing then to do tricks for the public it keeps them from their natural environment and stops them living a normal animal life.

The trainers may be making money and with that money they should help improve the animals living conditions, people that like watching bears ride on motorbikes and elephants standing on balls should really think what this is doing to the animals, they deserve a normal world in the jungle not whips whipping them constantly.

If they are going to do tricks it should be in a safe living place where the don't have to do stupid tricks.

I now leave you with this: if animals were in the place of humans would you like to be forced to do stunts that aren't in your nature? No is the answer.

---

It is also important to consider the performance of the age matched peer group.

Did they produce written samples below that expected of typically developing adolescents and therefore skew the results in favour of the TBI participants? Is there a need to better select control participants in group discourse studies such as this one? Snow, Douglas & Ponsford (1997) supported the notion that careful consideration needs to be taken when selecting appropriate controls in studies evaluating discourse in TBI as a number of pre-existing psychosocial and personal factors need to be taken into consideration. The control group were selected from the same semi-rural high school, which may not have represented the same background and education experience of all of the TBI participants. Snow et al., (1999) recommended the use of

orthopaedic patients as a control group due to their similar experience of significant trauma and similar social backgrounds. However, this would not have been appropriate in the current study considering the length of time post injury for the majority of participants with TBI (average time since injury = 8 years 5 months). In the current study, more rigorous inclusion and exclusion criteria could have been adopted informed by baseline academic records and teacher interview.

Discourse sampling by nature attempts to assess the most typically occurring forms of language and as such participant specific factors including personality traits, writing styles, motivation toward the task and previous knowledge of the subject can all affect the outcomes of the samples collected. Such factors are difficult to control for in group comparison studies like the current one and must be considered when generalising the findings of this study to the wider adolescent TBI population. However, a consideration to bear in mind is that these factors all combine to provide a more 'real world' representation of typical students, the types of students that adolescents with TBI interact with and work alongside on a daily basis.

#### 4.1.2 Pragmatic Outcomes – Elements of Persuasion

As expected, the TBI group differed significantly on pragmatic measures of essential argument to their peers. This was characterised by producing fewer reasons to support their claim and a complete lack of alternative perspective taking in developing their argument. The TBI group also produced a higher number of repetitions of information than their peers.

Each of these factors together characterized the TBI group's writing as less mature as a whole with such patterns usually seen in either the very young, or in students with specific learning disabilities (Crowhurst, 1990, Knudson, 1992; Feretti

et al., 2001). Feretti et al. (2001) considered the defining features of the LD group to be fewer reasons, fewer elaborations and lack of counter argument. The TBI group in the current study also under performed on the number of reasons measure compared with the 11-year-old group in the Nippold et al. (2005) study.

If the TBI group had produced significantly less language in their written essays than their age matched peers, it could have been argued that reduced productivity was the cause for the fewer number of reasons provided. However, measures of productivity were not significantly different between the groups. The increased repetitions of information from the TBI group with no differences between groups in the amount of information they produced suggested that there was true repetition of information. Further, participants were not penalised for repeating information in their conclusions as this was considered a summative device as opposed to simply repeating information. When reviewing the samples informally, repetitions were not used as stylistic or persuasive devices (e.g. Keeping animals in cages is cruel and wrong, cruel and wrong).

Biddle et al. (1996) found significant group differences on a measure of repetition of information with non-significant differences in information productivity similar to the current findings on a generative narrative task. The authors suggested that the TBI group used repetitions to elaborate when they were unable to organise and produce additional information. This also signalled decreased monitoring of output and an inefficient style.

The ability to consider alternative perspectives in an argument is considered a developmental milestone in persuasive discourse. Even considering that typically developing students may not develop this skill until later in their education, it is still worthwhile considering why the TBI group as a whole did not do this at all. One

possible line of thought is the role of theory of mind or metallising. This is the ability to infer other people's beliefs and intentions and is constructed in lower and higher order abilities. This allows children to adapt their consideration of how they behave, interact and use language in certain situations and to take the perspective of others. An example of second order theory of mind would be "Person A thinks that person B thinks that..." (Pellijeff & Rule, 2005). When applied contextually to the current study the example could read as "Person A thinks that person B thinks that using animals in circuses is cruel." Therefore person A says or writes, "Using animals in circuses to you may seem cruel, but there are many circuses where animals are treated well and are happy to be part of the performance."

Children with TBI have been found to differ significantly to their age matched peers on measures of higher order theory of mind such as the described example (Snodgrass & Knott, 2006; Pellijeff & Rule, 2005). It is possible that impairments in theory of mind impacted on the TBI group's ability to consider other's points of view and therefore did not account for this in their writing. This area warrants further investigation and it could be useful to measure second order theory of mind in ancillary testing procedures in the future.

## **4.2 Cognitive Impacts**

The impact of cognitive load associated with the written task needs to be taken in to account when interpreting the results. Many of the students with TBI were deemed to have below average written language abilities on writing vocabulary and writing grammar tasks and found the task of writing a persuasive essay difficult, attributable in part to these written language deficits. As previously discussed, aspects of written language and discourse production impact on working memory and

executive functioning capacity. It is conceivable then that the burden of the writing task effectively reduced the available cognitive resources required for generating a number of ideas, thinking flexibly and monitoring written output i.e. managing repetitions of information. It would be extremely useful to continue down this avenue of investigation by trialling methods of managing the cognitive and written demands of the task and noting if and where improvements are found.

### **4.3 Clinical Implications**

While a relatively new area of research, the current findings have direct implications for clinical practice. Written persuasive discourse needs to be included alongside other genres such as narrative and description in non-standardised discourse assessment batteries. The task used in the current study (based on the procedures of Nippold et al., 2005) was successful in generating a range of ideas and arguments across both groups and was relatively quick and easy to administer. This type of task and pragmatic analysis could be used in clinical settings to elicit data on basic and higher level persuasive skills necessary for education planning.

Speech language therapy intervention in written persuasive discourse for adolescents with TBI is also warranted. It seems that the TBI group, while able to produce adequate language for the task, were limited by their ability to develop their arguments, produce counter arguments and generate multiple novel ideas rather than repeating similar ideas using different words. Therefore interventions should seek to maximise students overall performance beyond their current capacity by adopting strategies that provide structural and organisational frameworks. These may include visual writing templates with writing boxes to assist with productivity and generation of multiple arguments, key conjunctions for facilitating transitions between

arguments, prompts for counterarguments and rebuttal and a space for summarising the argument. (See Appendix C). Other strategies reported in the developmental and learning disability literature would also be of benefit to the TBI group such as elaborated goal instructions and direct teaching on what makes a good argument (Feretti et al., 2001; Nausbaum & Necktash, 2004; Felton & Herko, 2004).

#### **4.4 Limitations of the Study**

While this study elicited some interesting and useful results, there were a number of limitations that need to be addressed for future replications or variations on the methods. The small sample size, though comparable to a number of other studies in the area of discourse impairment in TBI (Van Leer & Turkstra, 1999; Hay & Moran, 2003; Wilson & Proctor, 2002) was a limiting factor. Other studies investigating written persuasive discourse compared samples of groups of students ranging from 43 (Crammond, 1998) to 200 (Knudson, 1992). A higher participant number in the current study may have reflected greater language differences between the groups, particularly considering they were significantly different on standardised language measures.

It is well documented that the heterogeneity of the TBI population at large is a limiting factor in any TBI study and more so in studies into discourse involving developmental language and cognitive abilities as well (e.g., Reilly et al., 1998). One major limiting factor in recruiting the TBI group was the lack of information regarding severity of injury. A number of studies into discourse in children with TBI have shown a dose relationship between severity of injury and performance on discourse tasks (e.g. Brookshire et al., 2000). There had also been a relatively long period of time between the participants sustaining their injury and the study taking place (average time since injury = 8 years 5 months). During this time each of the

participants had received varying amounts of speech language therapy intervention as well as adapted education programs and teacher aid support.

The age matched peer group were all recruited from the same semi-rural combined intermediate and secondary school. While two of the TBI participants also attended this school it would have been ideal to have each age-matched peers selected from the same school or classroom as the TBI participant.

#### **4.5 Future Directions**

The current study has shaped several directions for future research in the area of persuasive discourse and adolescents with TBI. Of most imminent importance is the need for New Zealand based normative data with normally developing children and adolescents. When using non-standardised measures of communicative function such as discourse sampling one of the greatest limitations is the small degree of normative data that clinicians can compare performance of the person with TBI with (Snow et al., 1997). While seemingly a considerable undertaking, written persuasive discourse compositions are produced in secondary schools across the country on a regular basis and assessed via the National Certificate of Education Achievement (NCEA) external English examination for years 10, 12 and 13. A joint effort between adolescent TBI researchers and the New Zealand Ministry of Education and New Zealand Qualifications Authority could realise this need.

In regards to persuasive discourse measures, other measures beyond language complexity could be investigated to include organization and structure of compositions, grouping and sequencing of reasons and elaborations as well as measures of local and global coherence. These types of measures have been found to differentiate TBI groups from non-TBI groups more categorically than measures of

language complexity (Coelho et al., 2005; Chapman, 1997; Van Leer & Turkstra 1997; Wilson & Proctor 2002). Such measures would need to be tailored toward the persuasive genre as opposed to being taken directly from the other discourse studies such as narrative and description. Adding to the measures could be an overall persuasion rating as used in the studies by Feretti et al., (2001) and Knudson (1992).

Logically, investigation of spoken persuasive discourse would serve as a fruitful line of research with the TBI population. This could involve the evaluation and comparison of essential argument elements in monologic and interactive persuasion, leading towards a more ecological representation of persuasive discourse in practice. This line of investigation could evaluate the role of the interlocutor in cueing and prompting more sophisticated persuasive devices in the TBI speaker such as counter argument and rebuttal and then measure whether this dialogue is translated internally in a monologic sample.

Finally an intervention study into the benefits of various persuasive writing strategies with the TBI population would be valuable. This could include pre and post intervention measures of persuasive samples with interventions including the use of self-regulation strategies such as writing templates and planners, elaborated instructions and direct teaching about essential elements of argument.

## **SUMMARY**

Adolescents with TBI were found to differ significantly in comparison to their age matched peers on pragmatic measures on a written persuasive discourse task. The TBI group produced significantly fewer reasons to support their argument, produced significantly more repetitions of information and did not consider alternate perspectives in developing their argument. There were no significant differences on

measures of language productivity or complexity though the TBI group performed consistently below their peers on these measures. The results support the use of persuasive discourse tasks within non-standardised assessment batteries for adolescents with TBI and point towards the benefits of using self-regulation strategies to enhance the persuasive writing process for students with TBI. More work is required in this area to determine New Zealand based normative data with which to compare performance of the TBI population against. These initial findings provide the basis for an evolving and exciting line of research into the persuasive discourse abilities of adolescents with TBI.

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## APPENDICES

## APPENDIX A

**SHOULD CIRCUSES WITH TRAINED ANIMALS BE ALLOWED TO PERFORM FOR THE PUBLIC?**

People have different views on animals performing in circuses. For example, some people think it is a **great idea** because it provides lots of entertainment for the public. Also, it gives parents and children something to do together, and the people that train the animals can make some money. However, other people think having animals in circuses is a **bad idea** because the animals are often locked in small cages and are not fed well. They also believe it is cruel to force a dog, tiger, or elephant to perform certain tricks that might be dangerous. I am interested in learning what **you** think about this controversy and whether or not **you** think circuses with trained animals should be allowed to perform for the public. I would like you to spend the next 20 minutes writing an essay. Tell me exactly what you think about the controversy. Give me lots of good reasons for your opinion. Also, please use your best writing style, with correct grammar and spelling, and good handwriting. If you aren't sure how to spell a word, just take a guess. I will tell you when you have 5 minutes to go. Do you have any questions?



## APPENDIX B

### Pragmatic Scoring Criteria

1. Prepare the sample for coding by separating out each idea per line.
2. Apply the following coding criteria:

Measure	Code	Description	Example	Notes
Claim	[Claim]	A clear claim or statement of position or opinion should be given.	Animals should not be allowed to perform in circuses. [claim]	N/A
Reasons	[R1, R2 etc]	Reasons given to support that opinion. For each reason indicate the topic of the reason to assist with tying elaborations to the reason as the sample progresses.	It is very unfair to force animals to do trick, [R1 – Forcing Animals to do Tricks]	<ul style="list-style-type: none"> <li>• Duplicate reason code if simply a re-statement of reason e.g. Forcing animals to do tricks just isn't fair <b>[R1]</b></li> <li>• See below for list of topics to select from to assist with coding.</li> </ul>
Elaborations	[R1E1, R1E2, R2E1]	Provides additional supporting information for	Forcing animals to do trick is	<ul style="list-style-type: none"> <li>• Elaborations on a reason may occur</li> </ul>

	etc]	a reason e.g.: <ul style="list-style-type: none"> <li>• Examples</li> <li>• Details</li> <li>• Restates reason + additional information</li> </ul>	unfair because they are meant to be wild and run free, not dance for people with nothing better to do. [R1E1]	anywhere in the text, not necessarily directly after a reason.
Conclusion	[Conclusion]	Conclusion or summary statement.	In conclusion, animals in circuses should not be allowed to perform due to the mistreatment, poor living conditions and that they are not feed well enough. Animal were born to be free. <b>[Conclusion]</b>	<ul style="list-style-type: none"> <li>• Once the conclusion has been signalled in the text, no new reasons are coded (please make a note of these however) nor are reason repetitions coded.</li> </ul>
Conclusion Device	[RC] - Restate claim [S] - Summary	Type of conclusion device used, if any.	In conclusion, animals in circuses should not be allowed to perform due to	

	<p>main points</p> <p>[E] -</p> <p>Emotional appeal</p>		<p>the mistreatment, poor living conditions and that they are not feed well enough. Animal were born to be free.</p> <p>[RC] [S] [E]</p>	
Irrelevance	[IR]	<p>An irrelevant statement is defined as a statement that</p> <ul style="list-style-type: none"> <li>• Does not contribute the argument.</li> <li>• May still be related to the topic, but cannot be coded as a claim, reason, elaboration or conclusion.</li> <li>• Does not make sense to the reader.</li> <li>• Is implausible</li> </ul>		
Repetitions	e.g. [C], [R1]	<p>This is simply a repetition of a previous statement. Please code identically to the original. You don't need to repeat the topic of</p>	<p>It is cruel and wrong to force animals to tricks [R1 – Forced to do tricks]. They</p>	

		the reason in the code.	shouldn't be in captivity [R2 – Captivity] and they shouldn't be forced to do tricks [R1].	
Attitude		This is recognition that other people may have different opinions on the topic or various reasons.	Some people think it is ok to have animals in circuses but I don't.	<ul style="list-style-type: none"> <li>• This is not to be coded but please make a note of it.</li> </ul>

### **Topics for Reasons**

#### **Human Safety**

Anything regarding humans being put at risk of injury or death

#### **Forced to do tricks**

Anything regarding animals being forced to do tricks/acts against their will, they don't have a choice

#### **Physical Harm**

Anything regarding animals being beaten, hurt, injured, physical animal cruelty

#### **Mental Harm**

Anything regarding animals being mentally stressed, state of distress, mental animal cruelty

#### **Poor Diet**

Anything regarding the animal's diet e.g. lack of food, type of food

**Captivity**

Anything regarding animals being kept in captivity, small cages, space issues etc

**Equality/Fairness**

Anything regarding the differences between what is done to animals versus humans.

Anything regarding animals as living creatures with similar rights to humans.

Anything regarding sense of fairness.

**Naturalness (Environment/Animal)**

Anything regarding an animal being in its usual environment, the differences between usual environments and the circus e.g. places, conditions, sources of food

**Endangered Species**

Anything regarding the use of endangered animals, or animals on the verge of extinction.

**Excessive Travel**

Anything regarding animals travelling around with the circus from place to place

**Good Job**

Anything regarding the professional benefits of being a circus trainer

**Livelihood**

Anything regarding the financial gains of being a circus trainer

**Family Activity**

Anything regarding the circus as an event that families can go to together

**Entertainment Value**

Anything regarding the entertainment value of animals performing tricks etc. This can be construed in a positive or negative manner

**Other – Please State**

Anything not able to be coded as one of the above

## APPENDIX C

**Persuasive Writing Planner**

<p>Topic:</p> <p>Claim:</p>
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Convince	Explain	Prove
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<p>Reason 1:</p> <p>Data/Proof:</p>
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<p>Reason 2:</p> <p>Data/Proof:</p>
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<p>Reason 3:</p> <p>Data/Proof:</p>
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However	Even though	On the other hand
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<p>Counter argument:</p> <p>Why this is wrong:</p>
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<p>Conclusion (summary):</p>
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Ethics: Is it legal?	Morals: Is it right or wrong	Emotions: How does it make you feel?
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