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# Attention Deficit Hyperactivity Disorder & Narrative Comprehension Deficits in College Students

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ATTENTION DEFICIT HYPERACTIVITY DISORDER & NARRATIVE  
COMPREHENSION DEFICITS IN COLLEGE STUDENTS

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THESIS

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A thesis submitted in partial fulfillment of the requirements for the degree of Master of  
Science in the College of Arts and Sciences at the University of Kentucky

By

Laura E. Vincent

Lexington, Kentucky

Director: Dr. Elizabeth Lorch, Professor of Developmental Psychology

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2016

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## ABSTRACT OF THESIS

### ATTENTION DEFICIT HYPERACTIVITY DISORDER & NARRATIVE COMPREHENSION DEFICITS IN COLLEGE STUDENTS

The current study examined if the narrative comprehension deficits that children with ADHD exhibit during childhood and adolescence continue in college students as a function of ADHD symptoms, and if a relationship existed between ADHD symptoms and self-efficacy. Children and adolescence with ADHD have difficulties in several areas of narrative comprehension, including maintaining goal structure, distinguishing important events from unimportant events, and making causal connections. If these deficits persist there also may be a relationship between ADHD symptoms and self-efficacy.

Higher levels of ADHD symptomatology were associated with difficulties recalling story events in the college population. Some findings differed from the patterns observed for children and adolescents. College students with higher symptoms of ADHD recalled fewer events in the Growing Pains recall. However, unlike children and adolescents, college students with higher symptoms of ADHD did not recall fewer of the Growing Pains important events or causally connected events. The pattern of findings for the fables is consistent with that seen in research studying children with symptoms of ADHD. These deficits may lead to a serious deficit in academic outcomes within this population.

**KEYWORDS:** Narrative Comprehension, ADHD, College Students, Self-Efficacy, Deficit

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July, 26, 2016

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## The Effects of Attention Deficit Hyperactivity Disorder on Narrative Comprehension in College Students

Attention deficit hyperactivity disorder (ADHD) is characterized by core symptoms of inattention, hyperactivity, and impulsivity. ADHD affects many facets of an individual's life, including social relationships and academic achievement. Even though 42% of children diagnosed with ADHD continue to meet diagnostic criteria as adults (Barkley, 2008), most of the research and treatment for this disorder has focused on children. However, adults with ADHD continue to have difficulties in their daily lives, which include problems with organization, completion of tasks in a timely manner, and distractibility (Barkley, 2008). College students with ADHD report having difficulty sustaining attention during lectures and following through with reading and writing assignments (Klorman, Gift, & Gorman, 2009). This contributes to lower grades and a higher dropout rate for these adults relative to comparison peers (Barkley, 2008).

Although it is known that adults with ADHD continue to struggle during college, there is a paucity of research investigating the academic difficulties of this population. Our approach to understanding these academic difficulties was through examining problems with narrative comprehension. Research investigating the narrative comprehension of children with ADHD relative to comparison peers suggests that children with ADHD have several deficits, and that these deficits persist and even increase through late childhood and early adolescence (Bailey, Lorch, Milich, & Charnigo, 2009; Lorch, Milich, Flake, Ohlendorf, & Little, 2010). This indicates that these problems do not disappear over time and may continue to contribute to academic difficulties observed within the college population. However, no research existed that

investigated narrative comprehension of college students. Thus, the current study examined if the narrative comprehension deficits that children with ADHD exhibit during childhood and adolescence continue in college students as a function of ADHD symptoms. In addition, if college students are struggling with narrative comprehension, they may not believe that they are skilled in this area. Thus, their academic self-efficacy, or beliefs about their academic abilities, may be low. The current study addressed whether variations in college students' self-efficacy, concerning narrative comprehension and other academic tasks, were related to higher symptoms of ADHD and performance on narrative comprehension tasks.

### **Narrative Comprehension**

Narrative comprehension is important to the academic domain and is expected to be important to post-secondary success, because early narrative comprehension predicts later reading achievement skills (Kendeou, Lynch, van den Broek, Espin, White, & Kremer, 2005). Narrative comprehension includes the ability to direct attention, select, encode, and interpret important information, the use of story structure to guide recall, the manipulation of previously learned information, the generation of inferences, the self-monitoring of text, and the use of retrieval skills (Milich, Lorch, & Berthiaume, 2005). Successful comprehension requires the construction of a representation of events, and the understanding of the relations among events in a narrative. Children with ADHD, relative to comparison peers, have shown narrative comprehension deficits. Four main comprehension deficits for children with ADHD have been identified: 1. Difficulty using goal structure to build a coherent representation (Renz, Lorch, Milich, Lemberger, Bodner, & Welsh, 2003; Flory, Milich, Lorch, Hayden, Strange, Welsh, 2006); 2.

Difficulty understanding causal relations (Lorch et al., 2000; Lorch, Eastham, Milich, Lemberger, Sanchez, & Welsh, 2004); 3. Difficulty recognizing the important information within the story and using it to guide recall (Flake, Lorch, & Milich, 2007; Lorch, Diener et al., 1999); and 4. Difficulty making inferences (Van Neste, Hayden, Lorch, Milich, 2015).

Children with ADHD struggle with understanding and maintaining a goal structure, which is a necessary part of narrative comprehension (Lorch, Berthiaume, Milich, & van den Broek, 2007). According to the Story Grammar Theory (Mandler & Johnson, 1977; Stein & Glenn, 1979), goals, attempts, and outcomes are the most important idea units within a story because characters' goals motivate attempts to achieve those goals. In turn, attempts produce plot-relevant outcomes. Children with ADHD have difficulty maintaining and using goal, attempt, and outcome sequences to guide their story construction or narration (Flory, et al., 2006). When narrating wordless picture books, children with ADHD included fewer goal-based events in their narratives than did their peers, even though both groups of children included a similar number of events (Flory et al., 2006; Renz et al., 2003). Similarly children with ADHD are less likely than comparison children to include a goal sequence when creating a novel story (Freer, Hayden, Lorch, & Milich, 2011). If an individual is unable to maintain the goal structure throughout the narrative the coherence of the narrated story will suffer (Lorch et al., 2007).

In addition to difficulties with maintaining goal structure, children with ADHD also have difficulty understanding causal connections, which are the relations among events and their causes. These causal connections are central to the Causal Network

Model, which maintains that a coherent story representation reflects the causal links among events (Trabasso & van den Broek, 1985). Thus, events with many causal connections are more important to a story and more likely to be recalled than those with fewer causal connections (Trabasso & Sperry, 1985; van den Broek, Lorch, & Thurlow, 1996). Children with ADHD consistently have demonstrated problems with making causal connections (Lorch et al., 2004; Lorch et al., 2000), and correctly answering fewer causal relation (why) questions than comparison peers. Children with ADHD also show less sensitivity to causal structure than do their comparison peers, and recall fewer events on the causal chain that connect major events of a story (Lorch, Diener, Sanchez, Milich, Welsh, & van den Broek, 1999). These group differences persist and even increase throughout the elementary school years (Bailey et al., 2009).

The difficulty in understanding causal relations among story events, as well as difficulty identifying and maintaining goal structure, may contribute to problems with identifying and recalling important events. The ability to distinguish important from unimportant events may influence the quality of a recall and the number of important events recalled. Children with ADHD perform poorly when distinguishing important from unimportant events (Lorch, Milich, Astrin, & Berthiaume, 2006), and have difficulty recalling important events relative to comparison peers (Bailey, Derefinko, Milich, Lorch, & Metze, 2011; Flake et al., 2007). The problem seen in recalling important events does not go away over time (Lorch et al., 2010), and has been shown to continue into adolescence (Derefinko, Hayden, Sibley, Duvall, Milich, & Lorch, 2014).

Narrative comprehension deficits do not disappear with the use of stimulant medication (Bailey et al., 2009; Derefinko, Bailey, Milich, Lorch, & Riley, 2009). While

taking stimulant medication children with ADHD produce a greater number of story events in their narrative recalls than when not taking stimulant medication but they do not include more of the most important events (Bailey et al., 2009), and they have difficulty maintaining goal structure (e.g. Derefinko et al., 2009). Thus, even with the aid of stimulant medication, children continue to exhibit narrative comprehension deficits. Given that these deficits persist over time (e.g., Flake et al., 2007), and that medication is not an adequate solution to these difficulties, there may be a long-term problem with narrative comprehension in the absence of intervention.

Adults with ADHD continue to struggle with academic and comprehension-related tasks. College students with ADHD are more likely to have significantly lower educational performance (Barkley, Fischer, Smallish, & Fletcher, 2006; Biederman, Farone, Spencer, Mick, Monuteaux, & Aleardi, 2006), difficulty with study strategies, and a need for academic tutoring (Barkley, 2008). In addition, relative to their peers, young adults with ADHD performed significantly more poorly on reading comprehension tasks (Claude & Firestone, 1995), and on reading achievement tests (Roy-Burne, Scheele, Brinkley, Ward, Wiatrak, & Russo, 1997) than their peers. No studies could be found examining narrative comprehension with adults. Good narrative comprehension abilities are a necessary tool for college success: therefore, it was important to examine the narrative comprehension abilities of college students with ADHD, which may contribute to their academic difficulties.

### **Self-Efficacy**

It was possible that self-efficacy contributed to deficits in narrative comprehension. Self-efficacy is a task specific self-belief in an individual's own

capabilities to successfully perform a given action (Schunk, 1991). An individual's level of self-efficacy may have an effect on academic outcomes. For example, high self-efficacy for a particular task is generally associated with greater effort and persistence (Bandura, 1997; Gore, 2006). Self-efficacy has been found to play an important role in academic achievement (Zimmerman, Bandura, & Martinez-Pons, 1992). Thus, having higher levels of academic self-efficacy may lead to successful completion of academic tasks, including homework, reports, and exams. It was therefore important to study the relationship between self-efficacy and narrative comprehension in adults with ADHD.

Levels of self-efficacy appear to fluctuate in children with ADHD. Children with ADHD, as compared to their peers, have been found to have an inflated sense of self-efficacy after an interaction with another child (Diener & Milich, 1997). Children with ADHD were significantly more confident than comparison peers in predicting performance on multiple tasks, including solving a word puzzle (Milich & Okazaki, 1991), and completing a word-search task (Whalen, Henker, Hinshaw, Heller, & Huber-Dressler, 1991). However, when confronted with failure, children with ADHD gave up significantly more quickly and experienced greater frustration than comparison peers when confronted with unsolvable puzzles, particularly when these puzzles followed successful completion of solvable puzzles (Milich & Okazaki, 1991). Other research has shown a positive illusory bias for children with ADHD, which is a heightened inaccurate self-belief in one's own abilities. Positive illusory bias has been found in children with ADHD following a new but negative social experience (Hoza, Waschbusch, Pelham, Molina, & Milich, 2000). Individuals with positive illusory bias tend to believe they are much better at a task than they are in reality. The deficits seen in self-efficacy and

positive illusory bias may be the result of limited self-awareness of children with ADHD, and may also reflect a tendency to self-protect in the face of repeated failure in multiple aspects of life (Diener & Milich, 1997).

Although there has been an extensive examination of the self-efficacy of children with ADHD there is a paucity of research investigating self-efficacy for adults with ADHD. Research that has focused on self-efficacy for adults with ADHD has been mixed. Adults with ADHD exhibited reduced self-efficacy when completing general self-efficacy questionnaires (Newark, Elsasser, & Stieglitz, 2012), but it is unknown if this broad competence self-efficacy would extend to task-specific academic self-efficacy. In contrast adults with ADHD have been shown to have inflated levels of self-efficacy after completing a driving task (Weafer, Camarillo, Fillmore, Milich, & Marczinski, 2008). Although general and driving self-efficacy have been examined, there have been no studies examining self-efficacy for comprehension-related tasks in adults with ADHD. Further, these studies did not examine the robustness of self-efficacy when adults with ADHD experienced success or failure. Self-efficacy appears to be central to positive outcomes in academia and demands further study in this population.

### **Current Study**

The purpose of the current study was to examine narrative comprehension abilities and academic self-efficacy in college students with a range of ADHD symptoms. Children, as stated above, have been shown to have many narrative comprehension deficits such as trouble identifying GAO sequences (e.g. Flory et al., 2006), trouble making causal connections (e.g. Flake et al., 2007), and difficulty identifying important events (e.g. Lorch et al., 2004). Good academic performance is necessary to post-



secondary success, and if a student is lacking in comprehension related skills they will most likely fail. If the narrative deficits are observed among college students it is possible that individuals with higher symptoms of ADHD would have low levels of self-efficacy, such as seen in adults. Having low levels of self-efficacy will affect how persistent an individual is (Usher & Pajares, 2008), and therefore may affect grades and college outcomes. The current study examined four questions:

1. Are higher levels of ADHD symptomatology associated with greater narrative comprehension deficits for college students?
2. Is there a relationship between ADHD symptoms and self-efficacy?
3. Do variations in self-efficacy help to explain narrative comprehension difficulties for college students higher in ADHD symptoms?
4. Does self-efficacy change after completing a narrative comprehension task?

These questions were addressed by examining students varying in ADHD symptoms. The students watched a television program and read an audiotaped fable, and were tested on their recall of each story. The recalls were scored for important events, events on the causal chain, and global coherence. Based on previous research investigating the narrative comprehension deficits of children with ADHD, it was expected that narrative comprehension difficulties would persist among college-aged adults who exhibit high levels of ADHD symptomatology. The first question addressed whether higher levels of ADHD symptomatology were associated with greater narrative deficits. More specifically, individuals with higher levels of ADHD symptomatology were expected to recall fewer important events, answer fewer causal questions, and produce less coherent recalls. The second question addressed the relationship between ADHD symptoms and

self-efficacy. A significant negative relationship between ADHD symptomatology and self-efficacy was expected to occur, such that higher levels of symptomatology would be associated with lower levels of academic self-efficacy. The third question addressed whether variations in self-efficacy help explain narrative comprehension difficulties among college students higher in ADHD symptomatology. Finally self-efficacy, including items specific to narrative comprehension, were evaluated before and after task completion. Individuals with higher symptoms of ADHD and lower performance on narrative comprehension tasks were expected to show a greater reduction in academic self-efficacy after the task.

## **Method**

### **Participants**

A sample of 192 undergraduate college students from a local university varying in attention deficit hyperactivity disorder (ADHD) symptoms participated in this study. The potential participants varied from no symptoms to high symptomology based on the Barkley Adult ADHD Rating Scale (BAARS-IV). College students varied in age from 17 to 66, and 39 males and 153 females participated. Demographics were a representative sample of the university population, with 81.5% Caucasian, 7.2% African American, and 11.3% other.

There were specific exclusion criteria for this study. Participants were expected to be free of severe mental health problems, such as Schizophrenia or Manic Depressive Disorder. These illnesses are considered to be a distinctive set of disabilities, separate from the focus of this project. Students were also excluded if they were taking a

medication (e.g. Kapvay, or Intuniv) that cannot be discontinued prior to participation in the study.

Several methods of recruitment were employed. One major method was the SONA system, which was available to students fulfilling research participation requirements in PSY 100, PSY 215, and PSY 216. Participants using the SONA system read an online description of the study and eligibility requirements. These students then chose to sign up for specified time slots. These time slots were concentrated during the morning hours due to the possibility of cessation of medication.

In order to ensure the oversampling of students high in symptomology of ADHD, students in introductory psychology courses were able to participate in a screening session on the first day of Spring classes. During this screening session students completed the BAARS-IV. This provided the opportunity to oversample students with a high ADHD symptom count. Students who completed the screening session and signed up through the SONA system were followed up with an email. The email reminded the students of the eligibility requirements and of their appointment.

In addition to the SONA system and the associated screening session, flyers were posted around Kastle Hall. Individuals were able to respond to the flyers via email. We followed up with these participants to schedule their session via email. The follow-up email included a short description of the study, exclusion criteria, and available sessions.

Participants who were taking medications that could not be stopped on the day of testing, or medications that would not be out of their system within 24 hours of taking them, were excluded from the study. After informed consent was obtained, students completed a demographic questionnaire that included a question verifying medication

status. Students recruited through the flyers received \$20 for participation, and students enrolled in introductory psychology classes using the online recruitment system or SONA received course credit for participation. Participants who received course credit and those who received cash payment for participation were scheduled in separate sessions.

## **Materials**

### **Measure of ADHD Symptoms**

To determine ADHD symptomology the BAARS-IV was utilized (Barkley, 2011). The BAARS-IV is a validated self-report measure that includes the 18 DSM-IV symptoms of ADHD (APA, 1994) as well as nine symptoms of Slow Cognitive Tempo (SCT e.g. slow moving, prone to day dreaming when I should be concentrating on something or working, or easily confused). Participants responded to each item using a 4-point scale, ranging from 1 (sometimes) to 4 (very often). The internal consistency of the BAARS-IV total ADHD scale was found (Cronbach's alpha)  $\alpha = .914$ . The test-retest reliability was found to be:  $\alpha = .75$ . This scale was chosen due to its focus on adult ratings of ADHD.

### **Stimulus Materials**

Two episodes of the situation comedy *Growing Pains* were used as the narrative stories, and each lasted 22 minutes. The two episodes were called 'Charity Begins at Home' (Birthday) and 'Do You Believe in Magic' (Magic). The *Birthday* episode was about the three children competing to give their father a desirable present for his birthday. The youngest child has little money and asks the neighbors to give money for the needy. After buying an expensive present, he has to return all of the money, and learns that the monetary value of a gift is not important. During the *Magic* episode the family tries to

teach the oldest child a lesson about cheating other people by convincing him that a “magic rock” will help him complete a school project. The *Birthday* episode has 407 story events and the *Magic* episode has 615 story events. The episodes have been used in previous studies examining group differences in comprehension for children and adolescents with ADHD (e.g., Van Neste et al., 2014). The episodes were previously broken down into single story events, and the events have been rated by undergraduate students for importance (Lorch et al., 2000). Causal network analysis of each episode also was completed, with each event identified as on or off the causal chain proceeding from the beginning to the end of the story.

In addition to the Growing Pains episodes two fables were used, each of which takes approximately 4 minutes to read. *The Father, His Son, and Their Donkey* has 63 story events, and *Test of Strength* has 62 story events. Each fable had been used in previous studies (e.g., Lorch et al., 1999), and each focuses on the main characters’ goals and the obstacles encountered when trying to achieve their goals. *The Father, His Son, and Their Donkey* involves protagonists trying to achieve the overall goal of selling their donkey at the market, but are impeded by trying to please several groups of people along the way. *Test of Strength* involves a chief who asks his sons to show their strength by performing tricks. The sons then display their strength in an attempt to impress their father. Thematic importance of each event, on four levels, was previously determined by adult raters (Brown, Day, & Jones, 1983; Tannock, Purvis, & Schacher, 1993). Based on a causal network analysis completed by Trabasso and Sperry (1985), the number of causal connections and the causal chain status of each event were determined. These

fables have been used in previous studies examining group differences in comprehension for children with ADHD (e.g., Lorch et al., 1999).

### **Self-Efficacy Measure**

The Academic Self-Efficacy Scale was created by the authors. Self-efficacy is task-specific, therefore it was essential to create a scale that is specific to this study. The self-efficacy scale was created to measure the college student's self-beliefs specific to narrative comprehension tasks and their general academic beliefs. Each self-efficacy scale took approximately 10 minutes to complete and has 20 statements. The scale is composed of two types of statements; comprehension related statements (e.g., make inferences from what I have read) and statements regarding symptomatology of ADHD (e.g., concentrate on what I am reading for class). The statements regarding ADHD symptoms allow the authors to determine if higher symptomology is related to self-belief. This measure ranged from 1 (no confidence) to 100 (highly confident). The internal consistency of the Academic Self-Efficacy Scale was found (Cronbach's alpha)  $\alpha = .940$ .

### **Procedure**

Participants attended one group session (4-10 students), which lasted approximately 1.5 hours. After explaining the study and obtaining informed consent, a research assistant handed out a pencil and manila envelope. The manila envelope included a demographic form, BAARS-IV, lined paper, set of questions for *Growing Pains*, fable, puzzle set, and 2 copies of the Academic Self-Efficacy Scale. Participants were told, "You have each been invited to take part in a project concerning narrative comprehension. This session will take approximately 1.5 hours. You will be asked to watch a video and read a story. You will be asked to write down responses to questions

and complete several questionnaires. Some of you may have already completed one of our measures but please complete it again. Taking part in this study is on a volunteer basis. Your choice to participate will not affect your academic status or grades. You will not be penalized in any way if you withdraw from participation. You will receive 2 course credits for participation at the end of this session (or if recruited through flyers: You will be paid \$20 for participation at the end of this session). You will be given a copy of the consent to take home at the end of this session.” Then the group completed the demographic form and the BAARS-IV. For consistency all participants completed the BAARS-IV during this session, regardless if they completed it during the first day of Fall classes. Next the first self-efficacy scale was completed.

During the session college students were randomly assigned to view one of the two episodes of *Growing Pains*, as described above. The overhead projector at the front of the classroom was used, and participants had the puzzle set in front of them. The puzzle sets were used as a competing task during the assessment. The research assistant said, “In a few minutes there will be a television show from the 1980’s for you to watch. The age of this show is intentional so you are not familiar with the episode. I’m going to ask you questions about the show when it is over. Please attempt to complete the puzzle set while you watch. Treat this like you are multi-tasking. Please remember that this is a group format so it is important to be courteous to those around you and not speak out during the session. If you have any questions, just let me know.”

After the conclusion of the television show, a research assistant asked the students to put the puzzle set aside and take out the lined paper. Then the students were asked to write down everything they could remember from the show. Following the written recall

task, the participants were asked to take out the corresponding question list and answer the questions about what they saw. Next the students completed the second administration of the self-efficacy scale.

Next the participants read one of the two fables. The participants were asked to take the fable from the manila envelope and the research assistant said, “Next you will read a short fable. Pull out form #9. I’m going to ask you a question about the fable when you have finished reading it. Again, since this is a group format please be courteous to those around you and do not speak out while doing the task. If you have any questions, now is the time to ask.” Once the group read the fable, the participants were asked to put it aside and pull out more lined paper. Then they were asked to immediately recall everything that they could remember about the fable from beginning to end. Participants were asked to return all of the forms to the manila envelope and then were debriefed about the purpose of the study and handed a copy of the consent to take home. Immediately following they were paid or given information regarding points earned toward course credit, and finally excused.

## **Coding**

### **Event Recall**

A trained graduate student or undergraduate research assistant transcribed each hand-written free recall into electronic format. The undergraduate research assistant was blind to diagnostic status as well as the purpose of the study. The recall was then parsed into individual events and compared to previously determined events, resulting in a score 0 (not recalled) or 1 (recalled) for each event. The student did not have to recall the event verbatim, but credit was given if the gist of the event was represented. Research assistants



were trained on parsing and coding the recalls with a goal of achieving a kappa of .80. We determined the percentage of events that college students recalled on versus off the causal chain, and the percentage of events college students recalled at each level of importance.

### **Global Coherence**

Participant recalls of the televised program and of the fable were rated for global coherence on a scale of 1-4 (1= not at all coherent; 4= very coherent). Global coherence, as perceived by the coders, represents the coherence of the entire recall (Flake et al., 2007). The criteria for the 4 levels was: 1= reflected poor transitions from one idea to the next, poor communication while talking about the same idea, poor overall flow (choppy), significant difficulty explaining the sequence of events, and little or no storyline maintained; 2= signified some appropriate transitions to new ideas and connections within an idea, but difficulty explaining the sequence of events, some parts of the storyline maintained but little substance; 3= reflected appropriate transitions to new ideas and connections within an idea with good overall flow, only minor problems with transitions or connections, explains sequence of events clearly but with some ambiguities; and 4= signified appropriate transitions to new ideas and connections within an idea, with good overall flow, explains the sequence of events clearly with no or very few ambiguities (Lorch et al., 1999). The Pearson's  $r$  was used to assess the reliability of global coherence ( $r=.81$ ).

## Results

Participants completed the Barkley Adult ADHD Rating Scale (BAARS-IV) at the beginning of each session, which provided a symptom count to determine the level of ADHD symptoms of each individual. Participants at or above the median (score of 40) on the Barkley Adult ADHD Rating Scale are considered mildly, moderately, or markedly symptomatic, whereas those with a score of less than 40 are considered asymptomatic (Barkley, 2011). For purposes of this study, individuals with scores of 40 to 99 were designated the high symptom group and participants with BAARS-IV scores less than 40 constituted the low symptom group.

The primary question addressed in the current study was whether higher levels of ADHD symptomatology are associated with greater narrative comprehension deficits among college students. To answer that question free and cued recall of the Growing Pains episodes and free recall of the fables were evaluated. Analyses focused on whether overall recall differed for the two symptom groups and whether any group differences varied as a function of story structure variables (causal chain status, importance) or type of information targeted by cued recall questions (factual, causal). The global coherence of the fables was evaluated. This measure assessed how well free recalls of fables were expressed and organized.

### Growing Pains

Growing Pains free recall was examined in two mixed factors analyses of variance. In both analyses, story event recall was the dependent variable and ADHD

symptom group was the between-participants variable. In one analysis, the within-participants independent variable was causal chain status; in the second analysis, it was importance level ( $n=3$ ). As expected, participants recalled more events on the causal chain ( $M=15.84\%$ ) than those off the causal chain ( $M=3.70\%$ ),  $F(1,179)=855.79$ ,  $p=.000$ . Central to the research question, participants high in symptoms recalled fewer story events ( $M=8.94\%$ ) than participants low in symptoms ( $M=10.60\%$ ),  $F(1,179)=4.33$ ,  $p=.039$ . As shown in Figure 1, there was no significant interaction of symptom group and causal chain status,  $F(1,179)=1.38$ ,  $p>.10$ .

For both groups of participants, recall increased as the importance level of events increased,  $F(2,356)=693.02$ ,  $p=.000$  ( $M_s=3.62\%$ ,  $5.36\%$ ,  $16.10\%$  for events of low, medium, and high importance, respectively). Participants higher in ADHD symptoms tended to recall fewer events ( $M=7.70\%$ ) than participants lower in symptoms ( $M=9.02\%$ ),  $F(1,178)=3.70$ ,  $p=.056$ . As seen in Figure 2, there was no significant interaction of symptom group and importance level,  $F(2,356)=1.11$ ,  $p>.10$ .

**Growing Pains questions.** In addition to free recall, participants were asked questions testing their recall of factual events and their understanding of the causes of story events. Mixed factors analyses of variance were conducted on the percentage of correct answers, both with symptom group as the between-participants independent variable and question type as the within-participants independent variable. In the first analysis the two types of questions were factual and causal. In the second analysis, causal questions were divided into those where

the reasons for events had been explicitly presented and those requiring causes to be inferred. As expected, participants correctly answered more factual questions ( $M=85.57\%$ ) than causal questions ( $M=73.07\%$ ),  $F(1,177)=82.17$ ,  $p=.000$ . Similarly, participants correctly answered more explicit causal questions ( $M=78.27\%$ ) than inferential causal questions ( $M=68.57\%$ ),  $F(1,177)=23.84$ ,  $p=.000$ . However, there was no significant symptom group difference or interaction of symptom group and question type in either analysis.

## **Fables**

Free recall of the fables was examined in two mixed-factors analyses of variance, similar to Growing Pains recall. In both analyses, story event recall was the dependent variable and ADHD symptom group was the between-participants independent variable. In the first analysis, causal chain status was the within-participants independent variable; in the other, levels of importance ( $n=4$ ) was the within-participants independent variable. Similar to the Growing Pains episodes, participants recalled more events on the causal chain ( $M=44.47\%$ ) than events off the causal chain ( $M=16.20\%$ ),  $F(1,185)=732.12$ ,  $p=.000$ . Again, participants higher in symptoms recalled fewer events ( $M=28.93\%$ ), than participants lower in symptoms ( $M=31.74\%$ ),  $F(1,185)=3.88$ ,  $p=.05$ . In contrast to the results for Growing Pains free recall, these main effects were qualified by a significant interaction between causal chain status and symptom group,  $F(1,185)=7.36$ ,  $p=.007$ . As seen in Figure 3, there was no significant symptom group difference in recall of events off the causal chain  $t(185)=-.015$ ,  $p=.99$ , but participants higher in symptoms

recalled fewer events on the causal chain than did participants lower in symptoms  $t(185)=3.93, p=.000$ .

A similar pattern of results was observed in the analysis with importance level as the within-participants independent variable. As importance level increased, the proportion of events recalled increased  $F(3,558)=3.13, p=.025$ , and participants lower in symptoms ( $M=39.85\%$ ) recalled more events than participants higher in symptoms ( $M=37.52\%$ ),  $F(1,186)=7.27, p=.008$ . These main effects were qualified by a significant interaction between importance level and symptom group,  $F(3,558)=3.12, p=.025$ , as shown in Figure 4. Similar to the results for causal chain status, there was no significant symptom group difference for recall of low importance events,  $t(186)=-.44, p=.661$ , but at all other importance levels participants lower in symptoms recalled more story events than participants higher in symptoms,  $t(186)=2.28, 2.98, \text{ and } 1.99, p<.05$ , for medium-low, medium-high, and high important events respectively.

**Global Coherence.** In addition to evaluating the percentage of story events recalled as a function of story structure variables, the rated global coherence of recall protocols was compared across symptom groups with an independent samples t-test. The dependent variable was the fables global coherence scores and the independent variable was symptom group. Recalls were rated as less coherent for participants higher in symptoms ( $M=3.12$ ) than participants lower in symptoms ( $M=3.37$ ),  $t(168)=-2.06, p<.05$ .

In summary, the first question was whether deficits in narrative comprehension are observed in college students with higher levels of ADHD. There

was evidence for some difficulties for college students higher in symptoms, although not on all measures. Fewer story events were recalled for both Growing Pains and fables by the higher symptom group than by the lower symptom group. However, for Growing Pains the symptom group difference did not interact significantly with story structure variables, and there was no significant symptom group difference in performance on factual or causal questions. Fable recall showed the largest narrative comprehension deficits. College students with higher levels of ADHD symptoms showed a similar pattern of deficits as children with ADHD when recalling the fables. Specifically, college students high in ADHD symptoms had difficulty recalling important events and causally connected events, and their recalls were rated lower in global coherence than college students lower in ADHD symptoms.

### **Self-Efficacy**

A secondary purpose of the investigation was to examine self-efficacy in college students with higher levels of ADHD symptoms and its relation to narrative comprehension difficulties. Three research questions followed from this purpose: 1. Is there a relationship between ADHD symptoms and self-efficacy? 2. Do variations in self-efficacy help to explain narrative comprehension difficulties for college students higher in ADHD symptoms? 3. Does self-efficacy change after completing a narrative comprehension task? College students completed self-efficacy evaluations twice during the sessions, time 1 before the narrative comprehension tasks and time 2 after these tasks.

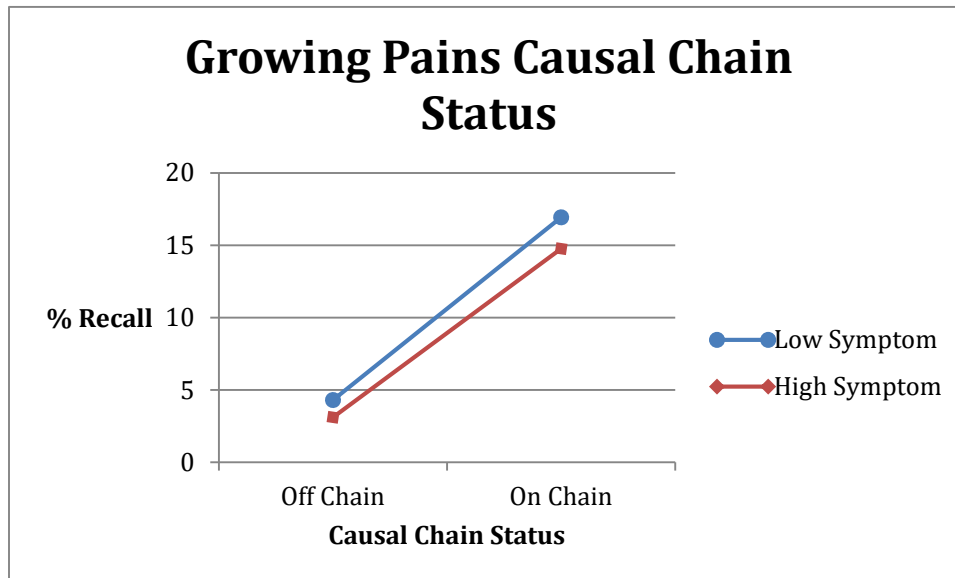
Preliminary to examining the relation between ADHD symptoms and academic self-efficacy, the correlation between time 1 and time 2 self-efficacy was evaluated. The two measures were highly correlated,  $r(192)=.94$ ,  $p=.000$ , so scores were averaged across time periods. The question of whether ADHD symptoms were related to academic self-efficacy was addressed both by comparing scores for the two symptom groups and by correlating number of symptoms with self-efficacy scores. Average self-efficacy was higher for the low symptom group ( $M=87.78$ ) than for the high symptom group ( $M=77.15$ ). Similarly, self-efficacy and the number of symptoms were negatively correlated,  $r(188)=-.53$ ,  $p=.000$ .

The validity of the academic self-efficacy measure was explored by evaluate whether academic self-efficacy was related to overall academic success, as measured by participant-reported GPA. Participants higher in self-efficacy indeed reported higher GPAs,  $r(141)=.349$ ,  $p=.000$ . In addition, those lower in ADHD symptoms reported higher GPAs,  $r(138)=-.18$ ,  $p<.05$ .

The question of whether variations in self-efficacy help explain narrative comprehension was examined focusing on free recall of fables, given that evidence of narrative comprehension deficits was strongest for that measure. The earlier analyses were repeated, but with self-efficacy averaged over the two time periods as a covariate. The covariate, self-efficacy, was not significantly related to the dependent variable  $F(1,188)=1.43$ ,  $p>.10$ , so it cannot help to explain the deficits.

The third question was whether self-efficacy changed after completing a narrative comprehension task. For this question the focus was on six statements specific to narrative comprehension. As shown in Figure 5, the change from time 1

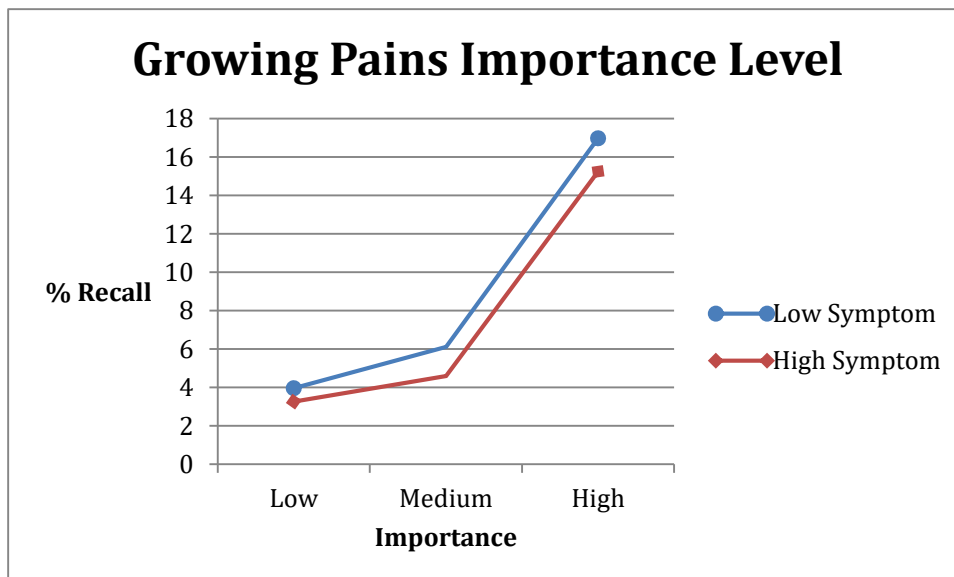
to time 2 was small but significant. Participants reported higher self-efficacy at time 2 ( $M=83.04$ ), than at time 1 ( $M=81.89$ ),  $F(1,186)=13.02$ ,  $p=.000$ . There was no significant interaction between symptom group and self-efficacy time of measurement,  $F(1,186)=1.04$ ,  $p=.31$ . Therefore, after completing a narrative comprehension task the self-efficacy of both groups increased similarly.



Growing Pains Causal Chain Status  
 Off Chain 3.70%  
 On Chain 15.84%

Group  
 High Symptom 8.94%  
 Low Symptom 10.60%

Figure 1: Growing Pains Causal Chain Status

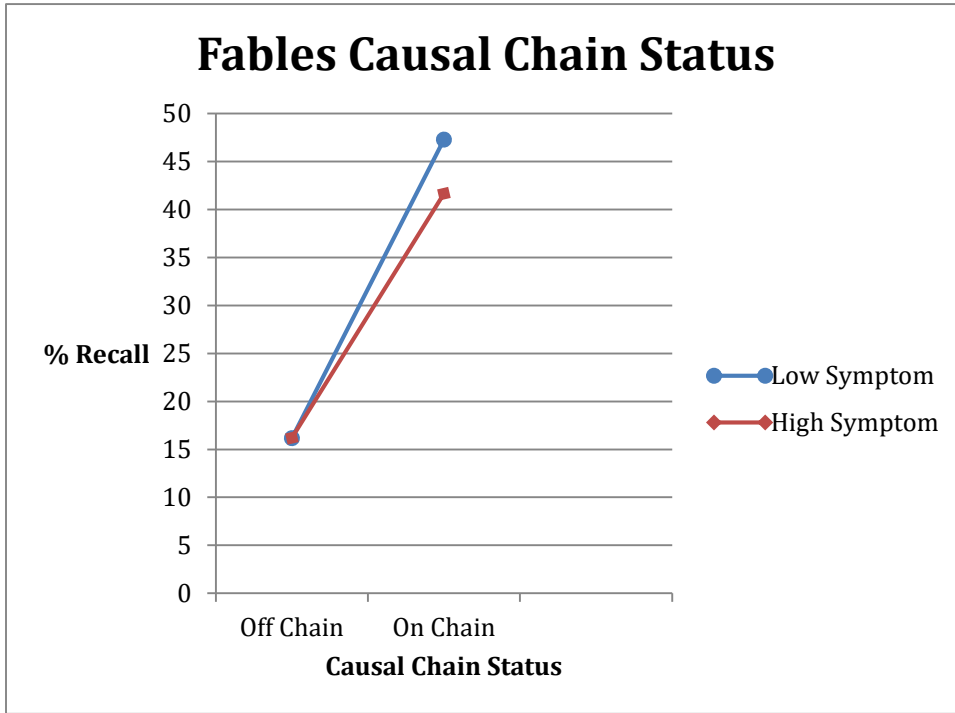


Growing Pains Low Symptom  
 Low 3.97%  
 Medium 6.12%  
 High 16.97%

High Symptom  
 Low 3.26%  
 Medium 4.6%  
 High 15.24%

Figure 2: Growing Pains Importance Levels

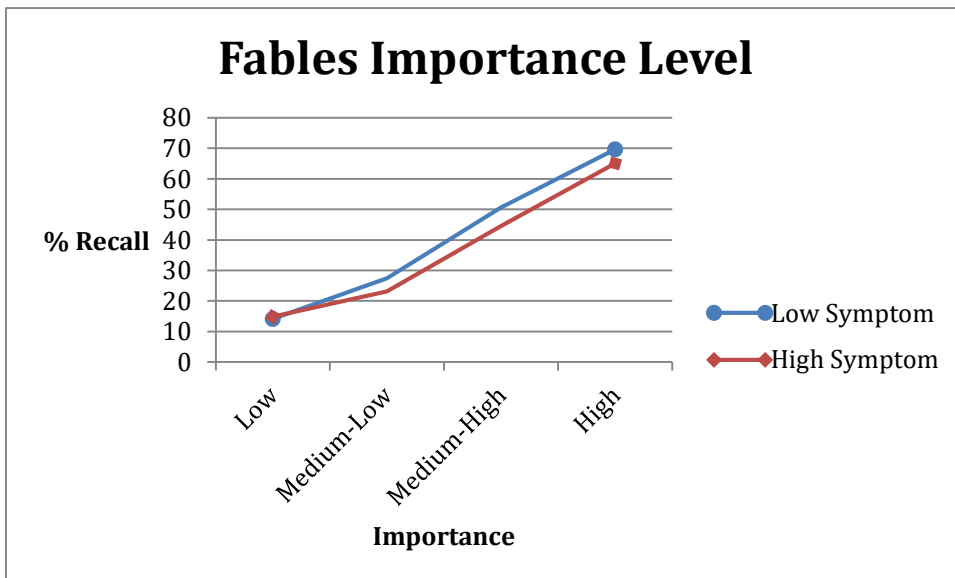




Fables  
Causal Chain Status  
 Off Chain 16.20%  
 On Chain 44.47%

Group  
 High Symptom 28.93%  
 Low Symptom 31.74%

Figure 3: Fables Causal Chain Status



Fables  
Low Symptom  
 Low 14.17%  
 Medium-Low 27.45%  
 Medium-High 50.63%  
 High 69.66%

High Symptom  
 Low 14.81%  
 Medium-Low 23.15%  
 Medium-High 44.57%  
 High 65.04%

Figure 4: Fables Importance Levels

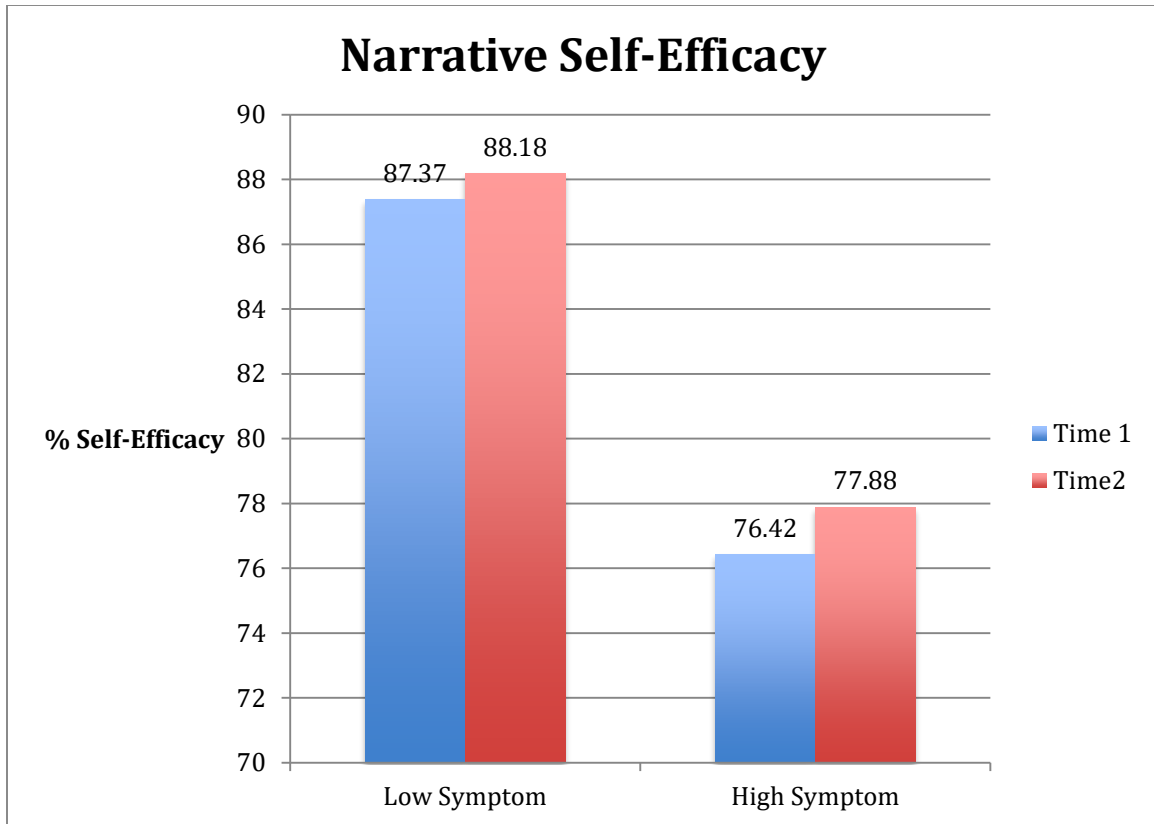


Figure 5: Self-Efficacy means from time 1 to time 2

### Discussion

The main purpose of this study was to investigate whether college students with higher symptoms of ADHD have deficits in narrative comprehension similar to those observed in many studies of children and adolescents (e.g., Bailey et al., 2009; Lorch et al., 2004; Lorch et al., 2010). Higher levels of ADHD symptomatology were associated with difficulties recalling story events in the college population, although some findings differed from the patterns observed for children and adolescents. Specifically, when recalling the fables college students with higher symptoms of ADHD recalled fewer events, important events, and causally connected events, and their recalls were less coherent than those of students lower in symptoms. The

pattern of findings for recall of fables is consistent with that seen in research studying children with symptoms of ADHD (e.g., Bailey, Derefinko, Milich, Lorch, &Metze, 2011; Lorch, Diener, Sanchez, Milich, & Welsh, 1999). For Growing Pains, college students with higher symptoms of ADHD recalled fewer events. However, unlike children and adolescents, college students with high symptoms of ADHD did not recall fewer of the Growing Pains important events or causally connected events.

Organization, sustained attention, and the delay of immediate rewards are common problem areas for adults with ADHD. Hyperactivity, impulsiveness, and inattention are the core deficits of ADHD that affect these skills (Barkley, Murphy, & Fischer, 2008). There also are difficulties with working memory and executive functions. Hyperactivity may decline as the individual with ADHD ages and may be replaced with restlessness (Arnold, 2016). Being restless may affect how a student answers a question or how they recall a story if they are unable to concentrate on the task at hand. Unlike hyperactivity, impulsiveness and inattention typically do continue within the college population (Arnold, 2016). Being impulsive may lead to snap judgments and failure to construct a coherent recall. Impulsive behaviors can indicate quick decision-making and a need for immediate rewards, which may be detrimental when determining what is important in the story that they just read. Inattentiveness can keep the individual from being able to maintain attention to the current topic. College students with ADHD report having difficulty sustaining attention (Klorman, Gift, & Gorman, 2009), which would be necessary to organize a coherent, complete recall.

There are several reasons why the college students with higher symptoms of ADHD may struggle with narrative comprehension. These college students may be focusing on the wrong information. If these college students are inattentive and impulsive, they may not be slowing down enough to carefully focus on the more important information necessary for successful comprehension. Having an understanding of what events are important to the story line is necessary to construct a complete representation of what is read. Focusing on the goals, attempts, and outcomes of a story will allow a reader to follow the storyline and better understand what is happening in the story (Lorch et al., 2007).

Problems with working memory are associated with ADHD. Researchers have examined visuospatial and auditory working memory and found mixed results. Most agree that adults with ADHD have a visuospatial working memory deficit, and some researchers agree on an auditory working memory deficit (Barkley, et al., 1996; Roberts, Milich & Filmore, 2012; Kercood, Lineweaver, & Kugler, 2015). Working memory is responsible for short-term storage and manipulation of information necessary for higher cognitive functions. Higher cognitive functions control memory, information processing, learning new information, and reading comprehension. College students with a working memory deficit would be expected to perform worse than their peers. If students are not actively holding relevant or important events in working memory while encountering new information they may not be able to create a coherent story representation. Students with higher symptoms of ADHD may have had trouble maintaining events important to the

developing story in the Growing Pains episodes in their short-term memory as they encountered new story information.

The results of this study may have important implications for understanding the academic deficits experienced by college students with higher symptoms of ADHD. One implication of these findings is to understand that college students with higher levels of ADHD symptoms have trouble recalling as many events in a story as their peers. Recalling events may be a serious problem in academic outcomes for these individuals. Remembering fewer events leads to a less complete recall of a story, and these problems may extend to information encountered in textbooks. When students read textbooks they must build an integrated representation of important information and an understanding of how details support more general points. If students with higher symptoms of ADHD remember fewer events, they may have difficulty achieving an integrated understanding of textbook information.

Remembering less information can affect overall comprehension and specifically affects remembering important events when recalling the fables. Understanding the important events in a story helps the reader construct a complete representation. Important events in a story include events on the causal chain of a story, which are essential to remember for a complete understanding of the story (Mandler & Johnson, 1977; Stein & Glenn, 1979). College students who cannot integrate and recall causally connected information will most likely not perform well on tests and other assignments.

Understanding the causal chain status of events may lead to a greater understanding of the student's academic work. College students, similar to children

with ADHD (Lorch et al., 2004), have demonstrated problems detecting events that are causally connected. Understanding why events happen is important to comprehension. Failure to make these causal connections leads to an incomplete representation of a narrative. College students who struggle with the causal chain status of events may not understand what these events are and how they are related to the story line. Poor comprehension of causal connections may result in lower grades, as seen in the reported GPA's.

Another problem suggested by the results of this study is for the global coherence measure. Global coherence scores may be reflective of poorer essays and writing assignments, which would be related to the lower GPA's. College students must be able to organize their recalls into a coherent whole (van den Broek, 1997). Writing effectively is a key ability central to a successful college career.

Struggling with identifying important events and causally connected events suggests that this population may need specific academic support, which shows a need for intervention. Offering academic clinics and seminars that target these deficits may reduce the gap in academic performance between college students with higher symptoms of ADHD and those with lower symptoms of ADHD. College students with higher symptoms of ADHD produce less coherent recalls, include fewer of the most important events and include fewer causally connected events. Focusing these clinics and seminars specifically on these deficits could enhance the academic experience for college students with ADHD.

Results from Bailey, Lorch, Milich, & Charnigo (2009) showed that deficits like the ones found in this study persist and even increase through late childhood

and early adolescence. This study provides evidence that they continue into the college population and that these deficits mostly do not disappear over time. As expressed, these deficits may have serious implications in college outcomes for this population.

### **Self-Efficacy**

The second purpose of this study was to examine if there was a relationship between ADHD symptoms and self-efficacy, if variations in self-efficacy help to explain narrative comprehension difficulties for college students higher in ADHD symptoms, and if self-efficacy changed after completing a narrative comprehension task. As predicted, self-efficacy was lower for the high symptom group than for the low symptom group, and self-efficacy ratings were negatively correlated with the number of ADHD symptoms. However, self-efficacy ratings were not related to narrative comprehension measures, so variations in self-efficacy did not help to explain narrative comprehension deficits for college students with higher symptoms of ADHD. Self-efficacy increased after completing a narrative comprehension task, and the increase was the same for both groups.

The negative relationship between ADHD symptoms and self-efficacy may be due to frequent difficulty with academic tasks. Self-efficacy has been found to play an important role in academic achievement (Zimmerman, Bandura, & Martinez-Pons, 1992). A significant causal path was found between efficacy for self-regulated learning, efficacy for academic achievement, and academic attainment in the Zimmerman 1992 study. Students who perceived themselves as able to control their own activities strategically were more confident about mastering academic subjects

and in turn performed better. Because college students with higher symptoms of ADHD reported lower GPA's they are receiving lower overall grades for their college assignments. Frequent failure may be leading to low self-belief in their academic abilities.

College students with higher symptoms of ADHD had lower levels of self-efficacy but self-efficacy was not related specifically to narrative comprehension. Narrative comprehension may not have had a relationship with self-efficacy because there were not enough narrative-specific statements. Six statements may not have been enough to tap into a self-efficacy deficit. Utilizing more statements could allow for a more detailed understanding of the individual's self-efficacy and allow researchers to gain a better understanding of this self-belief. Self-efficacy is task-specific (Schunk, 1991) and should have a relationship with narrative comprehension so by increasing the narrative-comprehension-specific statements a relationship should be found. The content of those statements may also need to be carefully considered. Instead of a statement such as "Comprehend what I have read or seen for class", more specific statements such as "I am able to identify and concentrate on the most important information that I read for class." may tap specific difficulties with narrative comprehension. Using more statements and being more specific with the content of those statements may be beneficial towards seeing a relationship between self-efficacy and narrative comprehension.

Offering an intervention with the opportunity of success may enhance the academic successes of individuals with ADHD. Applying an intervention in elementary school may help students with higher symptoms of ADHD to perform



better and potentially catch up to their peers. This intervention needs to target specifically students' ability to: remember the most important events; identify why events happened; and write coherently. Including an aspect of self-efficacy to help these students identify strength in their self-belief may be important to future success. Allowing the individual to monitor their own progress by answering self-efficacy questions may allow their self-efficacy to grow slowly as the intervention progresses. Their experience of success during the intervention may therefore strengthen their self-belief. This will therefore target narrative comprehension skills as well as self-efficacy.

Current college students may benefit from academic counseling to increase their self-efficacy, which may lead to increased performance (Erich, 2012). Pairing academic counseling with real strategies for success, and allowing students to monitor their own successes, should increase self-efficacy in that academic area. Academic counseling can help increase the college student's belief in their own ability to complete a narrative task successfully. Helping college students increase their awareness of their potential in completing academic tasks may lead to better performance, and therefore better GPA's. Going over the stories together with the student to point out what is the most important events and explaining the most causally connected events will teach these students how to determine them on their own. Utilizing specialty services for narrative comprehension deficits and self-efficacy limitations may increase productivity, increase grades, increase academic self-belief, and therefore increase overall GPA's.

## Limitations and Future Directions

One limitation may be how well story comprehension and recall performance relate to achievement on academic tasks. However, it has been found that aural and television narratives at age 6 directly predict reading comprehension at age 8, above and beyond predictors such as early vocabulary knowledge (Kendeou, et al., 2005). It is not known how well these tasks generalize to tasks assigned in school. Students may have had a different mindset for completing the research study versus completing assignments for classes. Utilizing classroom assignments during a standard instruction time may be more productive and offer better results. Teaching everyone in the classroom the benefit of defining important events and causally connected events would make the instruction more normalized.

The manner in which a college student completes an assignment is unlikely to be the same as when watching a television show. This could be why the fables results were consistent with children's studies and the Growing Pains results were not. The college students may not have viewed this as an academic task and therefore did not take it seriously. During future studies researchers could use a more academically based television program, such as a documentary, to tap into narrative comprehension deficits more directly. Utilizing a documentary may make the participants feel like they are participating in an academic event and therefore put more effort into their responses.

College students are better performers than the general population, which may have skewed the results. The ability to gain access to post-secondary education puts this sample at a higher intellectual level than the general population. This could

be why there weren't any differences in the Growing Pains recalls. A study should be considered using the general population as its participant group to look for differences in the Growing Pains and fables measures. This could tell us if this deficit is persistent within the general population and could lead to more help in high school for those with higher symptoms of ADHD. This way help can be provided before students leave the school system.

The requirements for this population of college students may have limited the results. Most of these students are required to participate in research to receive credit for their classes. This limitation could have led to a more unreceptive environment. The students may have felt forced to participate and therefore did not try their best. The incentive could be a cash payment for successful completion of the experiment and this would hopefully create an environment in which the participants cared about their results.

There may not have been enough specific narrative statements to tap into the true deficit of self-efficacy and narrative comprehension. Utilizing six statements to measure narrative comprehension self-efficacy may have not been enough. More narrative comprehension statements would have allowed the researchers to get a better idea of how academic self-efficacy is related to the narrative comprehension deficits that were found. The content of each statement should be carefully considered as well. During future studies the researchers should include more narrative comprehension self-efficacy statements in the survey and carefully consider the content of each statement.

## Conclusion

In summary, the findings from this study provide evidence that college students with higher symptoms of ADHD had difficulties with several aspects of narrative comprehension as compared to their peers. Specifically, college students with higher symptoms of ADHD recalled fewer events, and showed less sensitivity to the thematic importance within the stories. Additionally, college students with higher symptoms of ADHD recalled fewer causally connected events than their peers, and produced less coherent recalls. These college students also had lower self-efficacy than their peers, and self-efficacy ratings were related to the number of ADHD symptoms. However, there was no relationship between self-efficacy and narrative comprehension. These findings add to our knowledge of the narrative comprehension abilities and the self-efficacy ratings of individuals with higher symptoms of ADHD, and they suggest implications for an effective intervention, academic assistance, and academic self-efficacy counseling.

## Appendix A

### Instructions

For the first 27 items, please circle the number next to each item below that best describes your behavior **DURING THE PAST 6 MONTHS**. Then answer the remaining three questions.

Section 1	Never or Rarely	Sometimes	Often	Very Often
1 Fail to give close attention to details or make careless mistakes in my work or other activities	1	2	3	4
2 Difficulty sustaining my attention in tasks or fun activities	1	2	3	4
3 Don't listen when spoken to directly	1	2	3	4
4 Don't follow through on instructions and fail to finish work or chores	1	2	3	4
5 Have difficulty organizing tasks and activities	1	2	3	4
6 Avoid, dislike, or am reluctant to engage in tasks that require sustained mental effort	1	2	3	4
7 Lose things necessary for tasks or activities	1	2	3	4
8 Easily distracted by extraneous stimuli or irrelevant thoughts	1	2	3	4
9 Forgetful in daily activities	1	2	3	4

<b>Section 2</b>	<b>Never or Rarely</b>	<b>Some-times</b>	<b>Often</b>	<b>Very Often</b>
10 Fidget with hands or squirm in seat	1	2	3	4
11 Leave my seat in classrooms or in other situations in which remaining seated is expected	1	2	3	4
12 Shift around excessively or feel restless or hemmed in	1	2	3	4
13 Have difficulty engaging in leisure activities quietly (feel uncomfortable, or am loud or noisy)	1	2	3	4
14I am “on the go” or act as if “driven by a motor” (or feel like I have to be busy or always doing something	1	2	3	4

<b>Section 3</b>	<b>Never or Rarely</b>	<b>Some-times</b>	<b>Often</b>	<b>Very Often</b>
15 Talk excessively (in social situations)	1	2	3	4
16 Blurt out answers before questions have been completed, complete others’ sentences, or jump the gun	1	2	3	4
17 Have difficulty awaiting my turn	1	2	3	4
18 Interrupt or intrude on others (butt into conversations or activities without permission or take over what others are doing)	1	2	3	4

Section 4	Never or Rarely	Sometimes	Often	Very Often
19 Prone to daydreaming when I should be concentrating on something or working	1	2	3	4
20 Have trouble staying alert or awake in boring situations	1	2	3	4
21 Easily confused	1	2	3	4
22 Easily bored	1	2	3	4
23 Spacey or “in a fog”	1	2	3	4
24 Lethargic, more tired than others	1	2	3	4
25 Underactive or have less energy than others	1	2	3	4
26 Slow moving	1	2	3	4
27 I don’t seem to process information as quickly or as accurately as others	1	2	3	4

## Section 5

28 Did you experience any of these 27 behaviors at least “Often” or more frequently (Did you circle a 3 or 4 above? NO YES (Circle One)

29 If so, how old were you when those behaviors began? (Fill in the blank)  
I was \_\_\_\_\_ years old.

30 If so, in which of these settings did those behaviors impair your functioning? Place a check mark next to all of the areas that apply to you.

\_\_\_\_\_ School

\_\_\_\_\_ Home

\_\_\_\_\_ Work

\_\_\_\_\_ Social Relationships

## Attitudes About Academic Work

The following lists activities pertaining to your academic work. In the column **Confidence**, rate how confident you are that you can do them **as of now**. Rate your degree of confidence by recording a number from 1 to 6 using the scale given below:

1	2	3	4	5	6
Not confident at all		Moderately confident			Highly confident

### CONFIDENCE

1. \_\_\_\_\_ Finish homework assignments by deadlines
2. \_\_\_\_\_ Study when there are other interesting things to do
3. \_\_\_\_\_ Concentrate on what I am reading for class
4. \_\_\_\_\_ Take useful notes in class
5. \_\_\_\_\_ Make inferences from what I have read or seen
6. \_\_\_\_\_ Plan my schoolwork
7. \_\_\_\_\_ Organize essays that I write for class
8. \_\_\_\_\_ Comprehend what I have read or seen for class
9. \_\_\_\_\_ Remember the information I read in textbooks
10. \_\_\_\_\_ Complete tests during the allotted time
11. \_\_\_\_\_ Schedule my time appropriately to accomplish tasks
12. \_\_\_\_\_ Study effectively for tests
13. \_\_\_\_\_ Use any extra time that professor's give on exams to perform better



## Attitudes About Academic Organization

The following lists activities pertaining to your academic organization. In the column **Confidence**, rate how confident you are that you can do them **as of now**. Rate your degree of confidence by recording a number from 0 to 100 using the scale given below:

0      10      20      30      40      50      60      70      80      90      100  
Not confident      Moderately      Highly  
at all      confident      confident

### CONFIDENCE

14. \_\_\_\_\_ Manage class materials.
15. \_\_\_\_\_ Remember schedules and due dates.
16. \_\_\_\_\_ Organize materials for classes.
17. \_\_\_\_\_ Plan tasks and assignments.
18. \_\_\_\_\_ Understand directions for assignments.
19. \_\_\_\_\_ Comprehend what I read in textbooks.
20. \_\_\_\_\_ Finish tests within the available class time.

Appendix C

**Demographic and Personal Information Form**  
College Comprehension Project

**Date:** \_\_\_\_\_

**PID#** \_\_\_\_\_

**Gender (Circle one):**    Male        Female

**Age:** \_\_\_\_\_

**Ethnicity (Circle one):**

Black/ African American

Native American/ Pacific Islander

Asian

White/ Caucasian

American Indiana/ Alaskan Native

Other

Hispanic/ Latino

**Relationship Status (Circle one):**    Single    Married    Separated    Divorced

Widowed    Living w/ partner    In a relationship

**Have you ever received special education services? (Circle one):**    YES        NO

**If yes, when & where?** \_\_\_\_\_

**Have you ever been diagnosed with a reading or learning disorder?**

**(Circle one):**    YES        NO

**If yes, please describe:**

---

---

**Have you ever been diagnosed with a behavioral disorder or mental illness?**

**(Circle one):** YES NO

**If yes, please describe:**

---

---

**Are you currently taking medication for ADHD? (Circle one):** YES NO

**If yes: medication names & dosages?** \_\_\_\_\_

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**Did you take your medication this morning? (Circle one):** YES NO

**Please circle:** Freshman Sophomore Junior Senior

**Current GPA:** \_\_\_\_\_

## Appendix D

### Growing Pains Questions: Birthday

1. After Dad comes in, he gives Mike, Carol, and Ben their allowance. What is unusual about the allowance he gives them?

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2. What does Ben tell Mike and Carol that he's giving Dad for his birthday?

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3. Why does Mike think the ashtray is a stupid present for Dad?

---

---

4. When Mom asks Dad if they have plans for the weekend that she doesn't know about, why doesn't Dad tell her that it's his birthday?

---

---

5. Why do Carol and Mike argue about how much to spend on Dad's birthday present?

---

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6. When Mike and Carol are talking about how much money to spend on a birthday present for Dad, why does Carol make a sound like a chicken?

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7. Ben joins Mom and Dad in the kitchen and Dad asks Ben to tell Mom exactly what Saturday is. Why does Mom wink at Ben?

---

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8. Mom tells Ben that she'd like to get Dad a Mercedes car but she can't afford to, so she's getting him a fishing rod. Why does she explain this to him?

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9. Ben wants more money so that he can get Dad a nicer gift. He is watching TV and gets down on his knees to pray to God for money. Why did he decide to pray for the money?

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---

10. A woman comes to the door collecting money for the needy and Ben takes the can. Why does Ben say that he took the can?

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---

11. Ben asks Mike what to do to get money. What does Mike tell him to do?

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---

12. Why was everybody surprised that Ben gave Dad a camera?

---

---

13. When Ben said he got the money for the camera by collecting money for the needy, why does Mike look shocked and start to walk away?

---

---

14. When Mom asks Ben where he got the idea to collect money from the neighbors, Ben names two things. One is Mike. What is the other?

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---

15. As dad is questioning Ben about why he collected money from the neighbors, why does Ben remind Dad that the camera is self-winding and automatic focus?

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---

16. Ben suggests that his punishment should be going to bed at 9:00 every night for a week. Why does Dad say that can't be his punishment?

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17. Ben has to return the camera. What else does he have to do as part of his punishment?

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18. Why does Mike bring Mom a cup of tea and a muffin?

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19. Why does Dad say the ashtray is a good gift to use with some of his patients?

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20. The ash tray looks like a heart. Why would that help Dad's patients stop smoking?

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## Appendix E

### Growing Pains Questions: Magic

1. At the beginning of the show, Mike is supposed to be studying. Then, his friend Boner calls. Why did Boner call Mike?

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2. Boner asks Mike to go to the arcade. Even though Mike knows Dad wouldn't want him to go, Mike wants to go. Why is it still a problem for him?

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3. Why does Ben walk by Mike and say "Not a chance?"

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4. Mike tries to borrow money from Boner, Carol, and Ben, but no one wants to lend him money. What does Mike offer Ben to get Ben to lend him money?

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5. Why do Ben and Carol decide to bet real money on the card trick?

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6. After Ben and Carol bet real money, what happens when Mike tries the card trick again?

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7. After Carol tells Dad that Mike stole money from them, why does Ben ask Mike if he spent all the money at the arcade?

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---

8. Why was Dad upset when he found out Mike was at the arcade playing video games?

---

9. Why was Dad mad at Mike when he found out how Mike got the money to go to the arcade?

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10. Just after that, Ben tells Mom and Mike that he bought something for \$5. What was it?

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11. Ben offered to clean Mike's room for a dollar. What was another reason he offered to do this?

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12. After Mike leaves the room, Mom and Carol come out of Mike's closet giggling. What are they carrying?

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13. Why did Mom and Carol come out of Mike's closet?

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14. Why did Mike's family decide to con him?

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15. Mike gets mad at Ben and lifts his hands to choke him. Why does Mike stop and call him a terrific kid instead?

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16. Mike agrees to do Ben's chores and to pay him \$50 for the rock. Why does Mike want the magic rock?

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17. Why are Mom and Dad surprised when Ben comes home with a catcher's mitt?

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18. That night, Boner comes over to the Seaver house and says he is angry and looking for Mike. What does he tell the Seaver family that Mike did?

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19. Boner says he bought the magic rock from Mike and nearly killed himself on his skateboard. Why is he asking Mike's parents for money?

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20. When Boner says that the chemistry teacher has offered to pay him \$200 for the rock, why does Mike say that isn't fair?

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## Appendix F

### **The Father, His Son, and Their Donkey**

A father and his son were taking their donkey to town to sell him at the marketplace. They had not gone a great distance, when they met a group of pretty maidens who were returning from the town. The young girls were talking and laughing when one of them cried out, "Look there. Did you ever see such fools, to be walking along side the donkey when they might be riding it?" The father, when he heard this, told his son to get up on the donkey, and he continued to stroll along merrily. The traveled a little further down the road, and soon came upon a group of old men talking. "There," said one of them, "that proves what I was saying. What respect is shown to old age in these days? Do you see that idle young boy riding the donkey, while his father has to walk? You should get down and let your father ride!" Upon this the son got down from the donkey and the father took his place. The had not gone far when they happened upon a group of women and children. "Why, you lazy old fellow, you should be ashamed." cried several women at once. "How can you ride upon the beast, when that poor little boy can hardly keep up with you?" So the good-natured father hoisted his son up behind him. By now they had almost reached the town. "Tell me friend," said a townsman, "is that donkey your own?" "Why yes," said the father. "I would not have thought so," said the other, "by the way you overwork him. Why, you two are strong and are better able to carry the poor beast than he is to carry you." "Anything to please you, sir," said the father, "we can only try." So he and his son got down from the donkey. They tied the animal's legs together, and, taking a pole, tried to carry him on their shoulders over a bridge that led to the marketplace. This was such an odd sight that crowds of people gathered around to see it, and to laugh at it. The donkey, not liking to be tied, kicked so ferociously that he broke the rope, tumbled off the pole into the water, and scrambled away into the thicket. With this, the father and his son hung down their heads and made their way home again, having learned that by trying to please everybody, and lost their donkey, too.

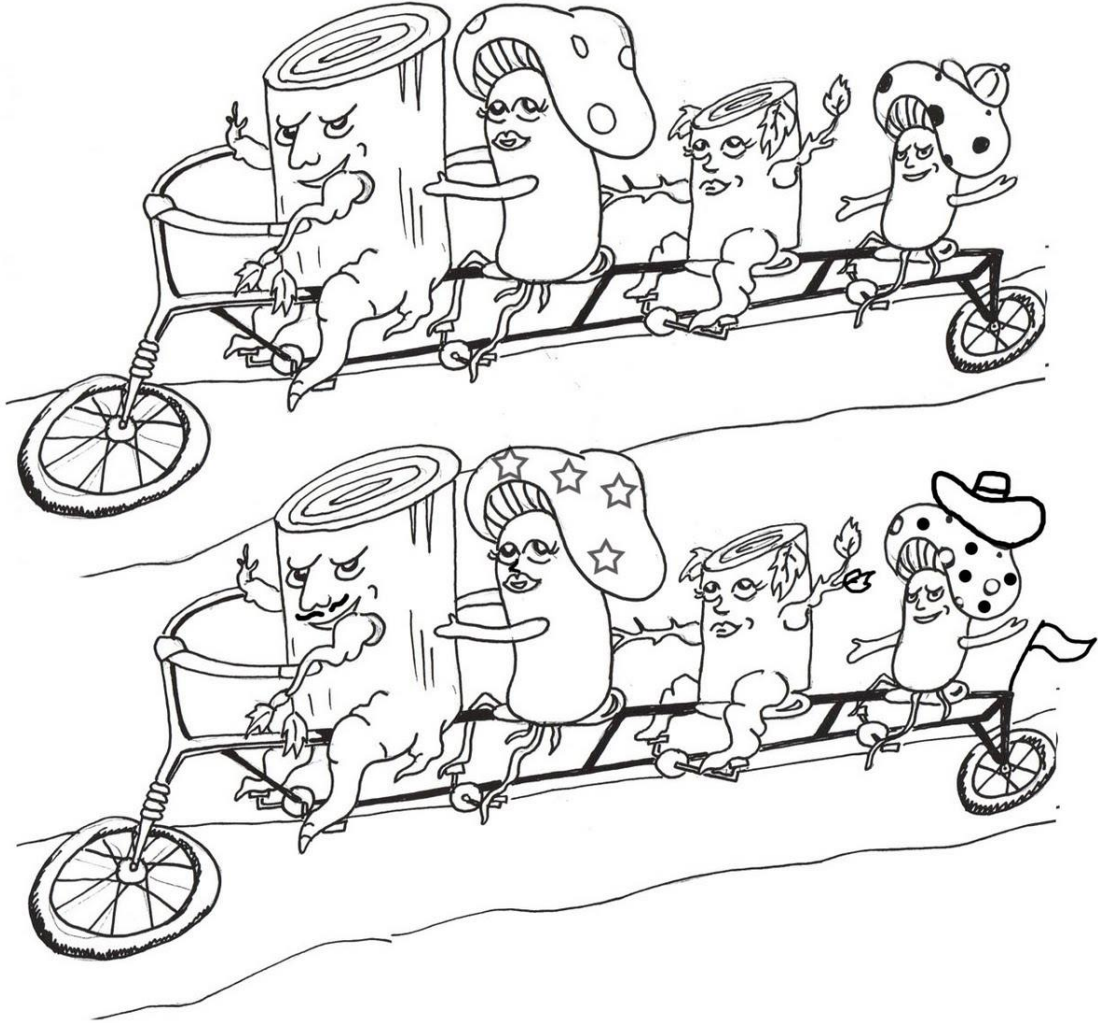
## Appendix G

### A Test of Strength

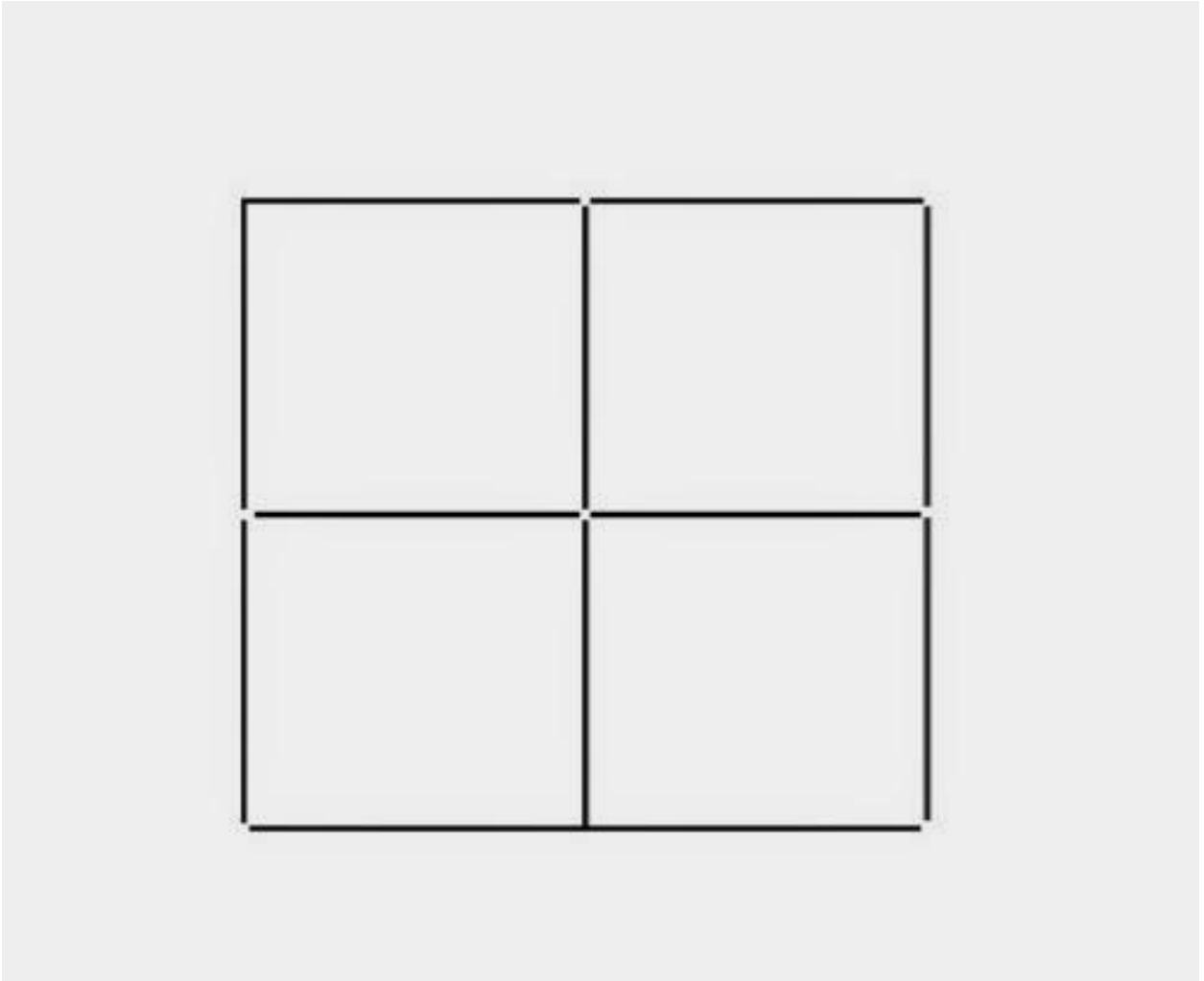
Once there lived a chief who had three sons. They were all fine, strong young men and very bright, too. But often their father wondered which of the lads was the strongest. One day his advisors gathered for a meeting. The chief looked around at the group of wise men, and asked them to help him decide who was the strongest. "Come over to this oak tree," he said to his advisors, "and let my three sons be brought here immediately." After a few moments the three young men appeared, each leading a horse. "My sons," said the chief, "I want each of you to mount your horse and show your power to all of my advisors. You may do whatever you please, but when you reach this oak tree, you must perform a trick To show us how strong and clever you are." The three sons mounted their horses, rode to the edge of a long path leading to the oak tree and prepared to show their strength. The first son came galloping straight at the tree, carrying no sword. The people were afraid he might crash against the tree. But suddenly, his horse rose in the air like an arrow and sailed right over the oak tree. The rider and horse landed unharmed on the other side. The crowd laughed with pleasure and surprise. "Surely," they said, "no one can do better than that." Then the second son, galloping furiously, made straight for the oak tree. He swerved neither to the right or the left. Holding his spear high he plunged it into the trunk with such force that it made a great hole. Then to everyone's surprise, the second son followed the spear and leapt through the hole, horse and all, making a perfect landing on the other side. Those who were watching shouted their approval with loud hearty cheers. "Surely the third son will not be able to do better than this," they said to each other and held their breath. The youngest son came riding toward the tree. As he reached it, he seized its branches in both hands, dug his heels into his horse and pulled the whole tree from the ground, roots and all. Then he rode up to his father, waving the tree and smiling. The crowd roared with applause for the strongest son.

# Spot the Differences

There are at least 6



In the following picture remove two lines such that only two squares remain instead of five:



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