Fall 2012

Mindset Memory: Do Theories of Intelligence Impact the Narrative Content of Autobiographical Memory?

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Autobiographical Memory?

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A thesis submitted in partial fulfillment of the requirements for the degree of
Masters of Science in Experimental Psychology
Department of Psychology
Seton Hall University
January, 2012

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Acknowledgements

Firstly, I want to give thanks to my advisor, Dr. Janine Buckner. I have learned so much from your tremendous feedback and help at every step of the thesis process. You have been a great adviser and mentor, and I am so happy and grateful that I had the opportunity to work with you. Thank you for teaching me how to perform research, and for allowing me to dream up a project that I truly loved. Working with you on this project has helped me to learn how exciting research is. Also, thank you for your constant support on everything from my career to personal life. I consider you not only my adviser and professor, but a friend. I hope to always be in touch with you! I would also like to thank Dr. Paige Fisher for being on my thesis committee and for allowing me to assist her on her own research. From the valuable feedback you gave me on my thesis and from witnessing you perform your own research so meticulously and passionately, I have learned how to become a better researcher. I also really want to thank you for all the help, advice, and guidance that you gave me about my career. You were truly generous with your time and help, and it was through your help that I was able to figure out exactly what I want to do. It was also a great pleasure getting to know you this year! I also want to thank Dr. Susan Nolan. It has been a great experience having you as a professor for two courses, and as a member of my thesis committee. I have really grown to understand and enjoy statistics, and it is all thanks to you! Also, thank you so much for all your valuable feedback on my thesis. Your feedback really helped me to become a more competent researcher. Also, thank you for all your help throughout my experience in this program. I also want to thank Warren Scott for all his help on my thesis. You were a great support for data collection and analysis! I really appreciate that you were always willing and ready to help! I also want to thank Dr. Margaret Brady-Amoon. I have learned a lot from all the conversations that we have had about our mutual research interests, and from assisting you in your research! I would also like to thank all the faculty members who are a part of the Master's program! I also want to thank my classmates who made this experience very enjoyable. I will always fondly remember the "RAT-C."

I owe my biggest thanks to my family and friends. Thank you mom and dad for making me the person I am today, and for devoting your life to your children. Thank you Anand for being the best brother a sister could ever have. Thank you Kajal, Kanan, and Agna for all the joy you have given me! Lastly, thank you to my grandparents, extended family, cousins, and friends for all their love and support.

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Abstract

The main aim of the current study was to assess if individuals who hold the theory of intelligence (TOI) that intelligence is fixed (Entity Theorists) and individuals who hold the TOI that intelligence is malleable (Incremental Theorists) differed in the content of their autobiographical memories (AM) about their academic successes and failures. Specifically, based on their experimental condition, participants were either asked to recall any experience of getting a good grade (academic success) or getting a bad grade (academic failure) within the last year. Participants were 168 undergraduate students. Participants' TOI were assessed based on their responses on the TOI scale (Dweck & Henderson, 1988). The AMs were coded for content related to nine dependent variables: overall emotion, positive emotion, negative emotion, overall cognition, mastery-oriented cognition, helpless-oriented cognition, overall behavior, mastery-oriented behavior, and helpless-oriented behavior. One-way ANOVAs were performed to determine if there was a main effect of type of memory recalled (success vs. failure) on the dependent variables. Furthermore, simple linear regressions were performed to explore if TOI scores predicted any of the dependent variables. The results of the ANOVAs indicated that there was a main effect of the type of memory recalled on all the dependent variables except overall behavior. The results indicated that failure narratives tended to contain more overall cognitions, helpless-oriented cognitions, negative emotions, and helpless-oriented behaviors than success narratives; while, the success narratives tended to contain more overall emotions, mastery-oriented cognitions, positive emotions, and mastery-oriented behaviors than failure narratives. The results of the Regression analyses indicated that Entity Theorists' affective content from their success AMs tended to be more positive than Incremental Theorists' affective content, that

Incremental Theorists' affective content tended to be more negative than Entity Theorists'

affective content, and that a bigger proportion of Incremental Theorists' narratives about their

successes were negative emotions than of Incremental Theorists' success narratives. The

regression results also indicated that Incremental Theorists' behavioral content from their failure

narratives tended to demonstrate a mastery orientation compared to Entity Theorists' behavioral

content, that Entity Theorists' behavioral content from their failure narratives tended to

demonstrate a helpless orientation compared to Incremental Theorists' behavioral content, and

that mastery-oriented behavior comprised a greater percentage of Incremental Theorists' failure

narratives than of Entity's Theorists' failure narratives.

Introduction

Learned helplessness is a phenomenon in which people believe that an aversive stimulus is uncontrollable and stable (Abramson, Seligman, & Teasdale, 1978). People who are experiencing learned helplessness believe that their efforts will not be efficacious in stopping the aversive stimulus; hence, they do not even try to use their cognitive and behavioral resources to plan and implement strategies to stop it (Abramson, Seligman, & Teasdale, 1978). Additionally, past research has also found that learned helplessness is associated with a vulnerability to develop negative affect and even depression (Abramson, Seligman, & Teasdale, 1978). Therefore, learned helplessness has cognitive, affective, and behavioral consequences. Dweck and colleagues explored the learned helplessness phenomenon specifically in achievement settings (Dweck & Leggett, 1988). According to Dweck's Social-Cognitive Model of Motivation and Personality, individuals with certain beliefs about intelligence develop learned helplessness when facing challenging situations in academic settings.

Dweck's Model of Motivation and Personality

Theories of Intelligence (TOI) are beliefs about the fundamental nature of intelligence. There are two types of TOI. The first TOI is the *Entity* theory of intelligence. According to the Entity TOI, intelligence is conceptualized as an innate ability within individuals, that they cannot control and/or increase through their own efforts (Dweck & Leggett, 1988). Any person who holds an Entity TOI is known as an Entity Theorist. The second TOI is the *Incremental* theory of intelligence. According to the Incremental TOI, intelligence is perceived as a malleable quality that can be increased through effort and practice (Bandura & Dweck, 1985; Dweck & Leggett, 1988). Any person who holds such an Incremental belief is known as an Incremental Theorist.

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According to Dweck's Social-Cognitive Model of Motivation and Personality, each TOI leads to differing aims and interpretations in achievement settings (Dweck & Leggett, 1988). Incremental Theorists focus on learning goals to improve their abilities; whereas Entity Theorists focus on performance goals that validate their existing abilities to selves and others (Elliot & Dweck, 1988). Failure has different implications according to learning and performance goals (Dweck & Leggett, 1988). According to Incremental Theorists' learning goals, failure signifies that they have not learned enough; whereas, according to Entity Theorists' performance goals, failure signifies that they do not have enough fixed intelligence (Dweck & Leggett, 1988; Elliot & Dweck, 1988).

As a result of Entity and Incremental Theorists differing goals and interpretations of failures in achievement settings, Dweck postulates that both types of theorists demonstrate different reaction patterns to failures, but similar reaction patterns to successes (Dweck & Leggett, 1988). Incremental Theorists' beliefs that they can grow their intelligence lead them to demonstrate mastery-oriented cognitive, affective, and behavioral reactions to failures and challenges (Dweck & Leggett, 1988). In the mastery-oriented reaction pattern, individuals believe that their efforts can impact the outcomes in their lives; thus, they use their resources to meet their goals. Mastery-oriented cognitions consist of constructive thoughts in which people concentrate on developing strategies and solutions to overcome obstacles and challenges (Dweck & Leggett, 1988). Mastery-oriented affect consists of demonstrating neutral or positive emotions (Dweck & Leggett, 1988). The mastery-oriented behavioral reaction consists of implementing strategies and task persistence (Dweck & Leggett, 1988).

Contrastingly, Dweck postulated that Entity Theorists' beliefs regarding fixed intelligence lead them to demonstrate helpless-oriented cognitive, affective, and behavioral

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reactions to obstacles and challenges. In the helpless-oriented reaction, individuals believe that their efforts cannot impact their outcomes, and consequently they do not even put forth effort when facing challenges (Dweck & Leggett, 1988). The helpless cognitive reaction consists of negative self, ability, and performance evaluations, ruminating, worrying, and focusing on problems instead of on solutions (Dweck & Leggett, 1988). The helpless affective reaction includes negative feelings including anxiety, aversion, and boredom (Dweck & Leggett, 1988). The helpless behavioral reaction includes not putting forth effort to work on problems efficiently, repeatedly utilizing unsuccessful strategies, and wasting time in order to avoid the task (Dweck & Leggett, 1988). Therefore, whereas people who hold a mastery-orientation believe that they have the power to control their academic outcomes; helpless-orientated people believe that they are powerless to control their academic outcomes.

It is important to note that according to Dweck's model, both theorists only differ in their reaction patterns when Entity theorists fail and feel helpless to change the outcome; when they are succeeding, both Entity and Incremental Theorists are postulated as demonstrating mastery-oriented reaction patterns (Dweck & Leggett, 1988).

Cognitive differences. According to Dweck's model, it is proposed that both types of theorists demonstrate contrasting cognitive responses during their challenging and failure experiences in achievement settings (Dweck & Leggett, 1988). Past research has shed light on some of these cognitive differences. Past research has found that both types of theorists differ in what they believe causes them to fail. Hong, Chiu, Dweck, Lin, & Wan (1999) found that Incremental Theorists were more likely than Entity Theorists to attribute their failures to lack of effort. Their finding suggests that Incremental Theorists TOI leads them to hold an attribution that their own efforts and actions are responsible for their achievement outcomes. Contrastingly,

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this finding also implies that Entity Theorists' TOI leads them to hold an attribution that their own efforts and actions are not responsible for their achievement outcomes.

Furthermore, past research has found that TOI impacts what a person expects from their future. Ahmavaara and Houston (2007) found that Incremental Theorists had higher academic and professional aspirations than Entity Theorists. Their results evidence that holding an Incremental TOI inspires and encourages people to hold higher academic and professional goals for themselves, while holding an Entity TOI demotivates people to hold lower academic and professional goals for themselves. For example, past research has found that TOI impacts motivation when a challenging experience is encountered. Specifically, Haimovitz, Wormington, & Henderlong (2011) found that Entity Theorists were more likely than Incremental Theorists to lose intrinsic motivation through the course of a school year, while Incremental Theorists were more likely to maintain their motivation. In other words, believing that intelligence is a malleable construct can be a better motivator when facing challenges, like an academic school year, then believing that it is a fixed quantity. Haimovitz and colleagues (2011) explained their results by suggesting that it is fruitful to keep working hard when a person knows that their efforts have the power to positively impact his or her future. On the other hand, it might seem pointless to work hard if a person believes that intelligence is fixed and that no matter how hard they work, his or her efforts will not be fruitful.

Though past research has shed light on cognitive differences between both types of theorists, such as attributional, aspirational, and motivational differences, no previous study has specifically explored if both types of theorists differ in their cognitive reactions to failures and successes which was postulated in Dweck's model.

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Affective differences. As Dweck's model predicts differing cognitive reactions during challenging situations in achievement settings, it also specifies contrasting affective responses during their challenging and failure experiences in achievement settings (Dweck & Leggett, 1988). Two previous studies have explored affective differences between Entity and Incremental Theorists. Shih (2011) and Robins and Pals (2002) performed similar studies in which they examined participants' TOI and emotions about their general classroom experiences. In this work, they investigated participants' emotions regarding their experiences in the classroom (Shih, 2011), or their feelings about their college GPAs (Robins & Pals, 2002). It is important to note that in Robins and Pals (2002) study, there were no GPA differences between Entity and Incremental Theorists. Both Shih (2011) and Robins and Pals' (2002) results demonstrated that Incremental Theorists generally reported higher levels of positive affect than Entity Theorists about their experiences in the classroom and their college GPAs. Entity Theorists instead demonstrated higher levels of negative affect than Incremental Theorists about their experiences in the classroom and their college GPAs. Shih (2011) explained the study's findings by arguing that Incremental Theorists' beliefs inspire them to feel positive emotions such as curiosity and enjoyment about their school work. Contrastingly, Entity Theorists' beliefs that intelligence is fixed lead them to feel negative emotions such as anxiety about how well they are performing.

The results of Shih's (2011) and Robins and Pals' (2002) studies demonstrate differences in how Entity and Incremental Theorists generally feel in the classroom and about their college GPAs. According to Dweck's model, both types of theorists have differing affective reactions to failures and similar affective reactions to successes. Though these results shed light on differences in what both types of theorists experience in the classroom generally, they do not address specifically differences in how each feels about their successes and failures.

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Behavioral differences. According to Dweck's model, both types of theorists demonstrate contrasting behavioral responses during their challenging and failure experiences in achievement settings (Dweck & Leggett, 1988). Past studies have started to explore these differences. In two survey research studies, participants filled out various self-report measures that assessed their general tendencies of reacting to academic situations in mastery-oriented and helpless-oriented ways (Robin & Pals, 2002; Shih, 2011). (Shih's (2011) affective findings from the same study were discussed in a previous section on emotions.) One of the studies called mastery-oriented behaviors "self-regulatory behaviors" and helpless-oriented behavior "self-handicapping behaviors" instead (Shih, 2011). The results of both studies supported Dweck's model and demonstrated that both types of theorists do act differently in academic settings. Incremental Theorists self-reported acting in mastery-oriented ways during challenging academic experiences than Entity Theorists, while Entity Theorists self-reported acting in helpless-oriented ways during challenging academic experiences than Incremental Theorists (Robin & Pals, 2002; Shih, 2011).

Two other studies also supported Dweck's model. Hong and colleagues (1999) performed a study at a Hong Kong University in which students who had previously received a grade of C or lower on a College entrance English proficiency exam were told that English proficiency was an imperative skill to have at this college because all lecture and assignments were in English. The participants were then asked if they would consider taking a remedial English class in the future. Hong and colleagues (1999) found that Incremental Theorists were more inclined to say that they would take a remedial course than were Entity Theorists. Nussbaum and Dweck (2008) performed a similar study but took it one step further. In their study, engineering students performed five problem sets on content that they were told was important for their career as an

engineer. All participants were given the same feedback: they received a perfect score (100 %) on four of the problem sets, but a score of 40% on the remaining set. The participants were then given a choice to watch a tutorial on any of the problem sets. Nussbaum and Dweck (2008) found that Incremental Theorists chose to watch the tutorial for the problem set on which they scored the worst, while Entity Theorists tended to select a tutorial on the material which they scored 100% on (Nussbaum & Dweck, 2008).

Taken together, the results of these studies showed that after performing badly on a proficiency test in their real life (Hong et. al, 1999) or on problem sets pertinent to their careers, (Nussbaum & Dweck, 2008), Incremental Theorists were more willing to take advantage of opportunities to learn unmastered material. Contrastingly, Entity Theorists were more willing to pass up opportunities to learn even though not learning the unmastered material could have real consequences on their academic and professional careers. Though, past research has found behavioral differences between both types of theorists when they were asked to choose between two different options, no study has yet assessed differences between how both types of theorists naturally act after experiencing an academic success or failure.

Table 1. Summary of Differences between Incremental and Entity Theorists Found in Past Research.

Cognitions		Incremental	Entity
	Attributions	Higher	Lower
	Aspirations	Higher	Lower
	Motivations	Higher	Lower
Affect			
	About Classroom Experiences	Positive	Negative
	About College GPAs	Positive	Negative
Behaviors			
	General Behavioral Tendencies	Mastery	Helpless
	Interest in learning un-mastered material	Higher	Lower

Current Study

The general purpose of the current study was to address holes in past TOI literature by taking a fuller assessment of the cognitive, affective, and behavioral postulates from Dweck's TOI model. To meet this aim, the research method of autobiographical memory was utilized. Autobiographical memory is a memory system which consists of recollections of an individual's life experiences. Autobiographical memories are combinations of specifically remembered objects, people, and events from particular times and places. These memories also include general knowledge and facts about the world (Conway & Pleydell–Pearce, 2000). Autobiographical memories are not objective records of exactly what happened; rather, they are constructed recollections that are influenced by various motivational and cognitive processes (Bruner, 1987; Markus, 1977). They are organized, explanatory accounts of actions in the world (reported in narrative form), which are integrated with subjective thoughts and emotions about those actions and outcomes (Bruner, 1987).

During any experience, individuals are exposed to many internal and external stimuli. Individuals' beliefs impact how they organize, summarize, process, and explain their experiences (Markus, 1977). As a result, TOI was expected to impact the content of the autobiographical memories. By analyzing the content of individuals' autobiographical memories, researchers have a unique insight into the details of personal experience that individuals take away with them (Markus, 1977). No past research has explored TOI utilizing autobiographical memory; hence, this is the first study to combine these two different sub-fields in psychology.

Past research has found that autobiographical memory serves three main purposes in individuals' lives: directive, social, and identity functions (Bluck, 2003). According to the *directive* function, autobiographical memories are utilized as a guide for present behaviors and

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for solving current or anticipated problems (Bluck, 2003). According to the *social* function, autobiographical memories are shared with others to develop and maintain social bonds (Bluck, 2003). According to the *identity* function, autobiographical memories are utilized for self-reflection, which leads to insight, self-growth, and coherent self-identities (Bluck, 2003).

The research method of autobiographical memory was used in the current study for three main reasons. Firstly, autobiographical memories play important functions in individuals' lives; hence, analyzing the impact that individuals' TOI has on their autobiographical memories can reveal important and previously unexplored impacts of TOI. Secondly, autobiographical memory was utilized because the researchers were interested in testing cognitive, affective, and behavioral differences between the different types of theorists. Autobiographical memories contain information about all of three of these categories; thus, by utilizing autobiographical memory, differences in all these three content categories could be assessed using the same data source. Lastly, in most past research, differences between both types of theorists have been measured through general self-report measures or through their reactions to negative feedback on laboratory tasks. This was the first study that assessed differences in how individuals thought, felt, and acted about personally-relevant experiences, rather than about a contrived situation or vignette. Most students have had many experiences of getting a good grade and getting a bad grade and so clearly they would have a common theme to relate for analysis; the specific experience that they choose to report is an experience that was personally relevant to themselves. Accordingly, through the results of this study, the impact that TOI has on how people react to and understand their own personally relevant experiences can be assessed.

In the current study, researchers were interested in assessing differences in the reaction patterns of Entity and Incremental Theorists to their academic failure and success experiences;

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hence, both Entity and Incremental Theorists were asked to recall an experience of an academic success or an academic failure. More specifically, participants were asked to recall an experience of either getting a good grade (academic success condition) or getting a bad grade (academic failure condition).The narratives were than analyzed for content differences.

Exploring content differences in both types of theorists' memories provided a new perspective on exploring the impact that TOI had on what each type of theorist experiences in and remembers about their experiences. Firstly, by analyzing the content of *each content category separately*, we were able to assess if both types of theorists differed in the mastery and helpless orientation of their cognitive and behavioral content, as well as the positive and negative orientation of their affective content. Secondly, by exploring content differences in *the narrative as a whole*, we could determine whether the theorists varied in the content of their stories about their successes and failures; hence, it could be analyzed if both theorists differed in what about their experience was most salient to them.

Most TOI research has found differences between Entity and incremental Theorists after they received negative feedback (failure) or about general experiences in academic settings (Robin & Pals, 2011; Shih, 2011). According to Dweck's model both Entity and Incremental Theorists are equally capable of thinking and acting in a ways to achieve goals, and thus both act in a mastery-oriented way when succeeding (Dweck & Leggett, 1988). It is only when Entity Theorists encounter challenges and failures that they feel helpless to change the situation, and as a resultant, they stop utilizing their cognitive and behavioral resources to improve (Dweck & Leggett, 1988). To this end, another aim of this study was to assess cognitive, affective, and behavioral differences between Entity and Incremental Theorists in narratives about their academic failures as well as their successes.

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Cognitive aims. Past TOI research has shed light on the differing mindsets of Entity and Incremental Theorists. Holding an Incremental TOI leads individuals to be more likely to hold attributions that a bad performance is a result of their own efforts (Hong et.al., 1999), to have higher aspirations for their future (Ahmavaara & Houston, 2007), and to sustain higher intrinsic motivation (Haimovitz et.al., 2011) than individuals who hold the Entity TOI. Though past research has discovered cognitive differences between both types of theorists, no previous study has yet specifically explored if both types of theorists do demonstrate the differing thought processes as presented in Dweck's model. Do Incremental Theorists demonstrate more mastery-oriented thoughts than Entity Theorists regarding their failures? Do Entity Theorists demonstrate more helpless-oriented thoughts than Incremental Theorists regarding their failures? To this end, a principal aim of the current study was to directly explore if both types of theorists do demonstrate these differing types of thoughts regarding their academic failure and success experiences in their recollections of the past. To meet this aim, the autobiographical memories about participants' academic successes and failures were analyzed for the occurrences of mastery-oriented cognition and helpless-oriented cognition. Through the results of this study, the researchers were able to assess if both types of theorists differed in how mastery-oriented or helpless-oriented the overall cognitive data found in their narratives were. Secondly, through the results of this study, the researchers were able to assess if both types of theorists differed in the percentage of their narratives that was mastery- and helpless-oriented cognitions.

Affective aims. Past TOI research has found that Incremental Theorists demonstrate more positive emotions regarding their classroom experiences (Shih, 2011) and college GPAs (Robin & Pals, 2002) than Entity Theorists. Though past research has shed light on affective differences between both types of theorists, no study has yet specifically explored the affective

postulates in Dweck's model that Entity Theorists demonstrate more negative emotions regarding their failure experience than Incremental Theorists. Thus, the second aim of the present study was to test Dweck's idea that Entity and Incremental Theorists would report different affective reactions to their failures, but discuss similar affective reactions to their successes. To meet this aim, the autobiographical memories about participants' academic successes and failures were analyzed for the occurrences of positive and negative emotions. Through the results of this study, the researchers were able to assess if both types of theorists differed in how positively-oriented or negatively-oriented the emotional content of the narratives was _overall_. Secondly, the researchers were also able to assess if both types of theorists differed in the percentage of their narratives that was positive and negative emotions.

Behavioral aims. The findings of past research do provide support for the behavioral postulates in Dweck's model by demonstrating that Incremental Theorists generally utilize more mastery-oriented behaviors in the classroom than Entity Theorists, whereas, Entity Theorists utilize more helpless-oriented behaviors in the classroom than Incremental Theorists (Robin & Pals, 2002; Shih, 2011). Additionally, past research has also found that Incremental Theorists are more likely to choose to take advantage of opportunities to improve their knowledge of unmastered material than Entity Theorists (Hong et. al, 1999; Nussbaum & Dweck, 2008). Past research has found that when given a real or hypothesized opportunity to learn unmastered material, Incremental Theorists are more likely to take advantage of it than are Entity Theorists, but no study has yet explored differences in the behaviors that both types of theorists naturally demonstrate when they face academic successes and failures. Does one group "masterfully" face challenges by applying effort and demonstrating persistence and strategy development, whereas the other group "helplessly" gives up and destructively copes by not even trying to overcome the

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challenge? Thus the third main aim of the current study was to directly assess if both types of theorists act differently in their success and failure experiences.

To meet this aim, the autobiographical memories about participants' academic successes and failures were examined for occurrences of mastery-oriented behavior and helpless-oriented behaviors. Through the results of this study, the researchers were able to assess if both types of theorists differed in how mastery-oriented or helpless-oriented the overall behavioral data found in their narratives were. Secondly, through the results of this study, the researchers were able to assess if both types of theorists differed in the percentage of their narratives that was mastery- and helpless-oriented behavior.

Secondary aim. Before moving directly to analysis of narrative content for helpless and mastery orientations, one more piece of relevant literature needed to be addressed. That is, in order to accurately understand the impact that TOI has on the content of autobiographical memories about failure and success experiences, it is pertinent to first better understand the type of content generally found in success and failure narratives. Therefore, the secondary aim of this study was to assess general differences in the affective, cognitive, and behavioral content between the narratives about success and those about failure experiences.

Success and failure experiences are examples of positive and negative experiences, respectively. Though no past research has explored content differences between the autobiographical memories of success and failure experiences specifically, many studies have explored differences between the narratives about positive and negative experiences generally. In these other previous studies, people might have chosen to write about succeeding or failing, but participants are not specifically asked to remember their autobiographical memory of successes and failures.

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In the aforementioned autobiographical memory studies, participants were typically asked to select any positive or negative experience to share (Bohanek, Fivush, & Walker, 2004; Fivush, Brotman, Buckner & Goodman, 1998; Fivush, Hazzard, Sales, Sarfati, & Brown, 2002; Porter & Birti, 2001), or to recall any happy or angry/frustrated/scared experience (Fivush, Sales, & Bohanek, 2008; Peterson & Biggs, 2001). In these studies, the narratives were not specifically coded for the cognitive and behavioral variables used in the present study, but rather the narratives were analyzed for content differences in internal state language (i.e., cognitive processing words and emotion words). Examples of cognitive processing words are "because," "therefore," and "as a result of."

The results of each of the studies were consistent for the most part; that is, across this work, evidence reveals that negative narratives contain more cognitive processing words and overall emotion; while positive narratives contain more sensory information (Bohanek et.al, 2004; Fivush et.al, 2002; Fivush et.al, 2008; Peterson & Biggs, 2001; Porter & Birti, 2001). Contrastingly, Sales and colleagues (2003) found that positive narratives contained greater overall emotion. It is important to note that in the majority of the studies that found that narratives about negative experiences contained more overall emotion terms, the researchers had coded cognitive processing words and emotional words in the same content category. Only in the Sales, Fivush, and Peterson (2003) study were emotions and cognitive processing words were analyzed using different content categories.

In the current study, the narratives were analyzed for content differences. Specifically, the narratives were coded for the occurrences of the three content categories of cognition, affect, and behavior with each content category also having two sub-categories representing the helpless or mastery orientation reaction pattern. The two sub-categories for cognition were mastery-

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oriented cognition and helpless-oriented cognition. The two sub-categories of emotion were positive and negative emotion. The two sub-categories for behavior were mastery-oriented behavior and helpless-oriented behavior. Thus each narrative was coded for the occurrences for all three categories and six sub-categories. (See methods for more detailed descriptions of coding categories.)

Autobiographical is a complex data source. The data for each dependent variable was analyzed in relation to the total content of its content category as well as the total content of the entire narrative. Analyzing the content of each dependent variable in relation to the total content of its content category sheds light on differences between Entity and Incremental Theorists in the *type* of cognition, affect, and behavior they use. Analyzing the content of each dependent variable in relation to the total content of the overall narrative sheds light on differences between Entity and Incremental Theorists in *how much* each dependent variable is a part of their stories of their success and failures. It is important to note that the cognitive, affective, and behavioral content that were found in the narratives do not demonstrate an exact and exhaustive source of the reactions that they had during their experiences, but rather the information that the participants both paid attention to during their experience as well as recalled at the time of the recollection.

Similar to past narrative research, in the current study it was assessed if success and failure narratives systematically varied in amount of cognitions and emotions that they contained. Additionally, we also coded the narratives for behaviors. Some of the research questions related to the variable of type of memory recalled are as follows: Would success or failure experiences result in greater processing, as evidenced by a higher amount of total cognitions? Which type of experience would elicit greater affective content, as evidenced by a

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higher amount of emotional references? Which type of experience would result in greater recall of what the narrator did in that experience, as evidenced by a higher total amount of behavioral references?

Hypotheses. In summary, the current study was driven by the need to add to the lines of research in TOI, and the sub-field of narrative research which explores differences in the narrative content of positive and negative academic experiences. This was the first study that combined these two different sub-fields of psychology (autobiographical memory and Theories of Intelligence research). These issues were tied together in a single methodology in which narratives regarding academic success and failure experiences were coded to explore content differences based on the variables of type of memory recalled and TOI.

Specific hypotheses for theories of intelligence. This was the first study to assess cognitive, affective, and behavioral differences between Entity and Incremental Theorists regarding both their failure and success experiences in one study. We hypothesized that, on average, positive emotion, mastery-oriented cognition, and mastery-oriented coping behavior would be greater percentages of Incremental Theorists' narratives about getting a bad grade than of Entity Theorists narratives about getting a bad grade. Negative emotions, helpless-oriented cognition, and helpless-oriented behavior would be greater percentages of Entity Theorists' narratives about getting a bad grade (failure condition) than of Incremental Theorists' narratives about getting a bad grade. We also hypothesized that, on average, Incremental Theorists' affective, cognitive, and behavioral content would demonstrate a greater mastery-orientation than Entity Theorists' affective, cognitive, and behavioral content. In the same vein, on average, Entity Theorists' affective, cognitive, and behavioral content would demonstrate a greater helpless-orientation as compared to Incremental Theorists narratives about getting a bad grade.

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These hypotheses were based on past research in the TOI research that has found that Incremental Theorists have greater aspirations (Ahmavaara & Houston, 2007), motivations (Haimovitz et. al., 2011), positive affect about their experiences in the classroom (Shih, 2011), and likelihood of taking advantage of real (Nussbaum & Dweck, 2008) or hypothetical opportunities (Hong et. al., 1999) to increase their intelligence than Entity Theorists. However, TOI score was not hypothesized to predict any of the dependent variables in the *success* condition. Thus, despite the numerous predictions for the failure condition, it was hypothesized that there would be no significant differences in the content of the success narratives, because no past research has found differences between both types of theorists regarding their success experiences.

Specific hypotheses for memory type. Past narrative research has explored content differences in internal state language (words that reference cognitions and emotions) between narratives about general positive and negative experiences. In the current study, we took this line of work one step further and we collected narratives about academic success and failures (specific types of positive and negative experiences). In much of the past narrative research, cognitions and emotions were analyzed in the same category. We added to past narrative research because we not only analyzed cognitions and emotions in separate categories, but we also analyzed the narratives for different types of cognitions and emotions (i.e., mastery-oriented (positive) and helpless-oriented (negative) words). Additionally, we also analyzed the narratives for two different types of behaviors (i.e., mastery-oriented and helpless-oriented).

We hypothesized that, on average, the narratives in the failure condition would have more negative emotion, helpless-oriented cognition, helpless-oriented behavior, total emotion, and total cognition; while, on average, the narratives in the success condition would have more

positive emotion, mastery-oriented cognition, and mastery-oriented behaviors. These hypotheses were based on past research that found that, on average, narratives about negative experiences contain greater cognitive processing and emotionality words (Bohanek, Fivush, & Walker, 2004; Fivush, Hazzard, Sales, Sarfati, & Brown, 2002; Fivush, Sales, & Bohanek, 2008; Peterson & Biggs, 2001; Porter & Birti, 2001).

Method

Participants

Participants were 168 undergraduate psychology students who are all over 18 years of age from a medium-sized private, Catholic University in the northeastern part of the United States. See Table 2 for all demographic information about the participants in this study. Students were recruited following the Psychology Department protocol of that University from their psychology research pool using their online SONA system. Participants received credit in a psychology class that either required or granted extra credit for their participation in research. Students also had the option to write a paper to fulfill the research participation requirement for their psychology courses.

Table 2. Demographic Information for all Participants.

Gender		Ethnicity		Social Economic Status		Year in college	
Female	74.40%	American Indian	1.10%	Upper	3.33%	Freshman	34%
Male	25.60%	Asian American	10.50%	Middle- Upper	25.56%	Sophomore	38%
		African American	11.60%	Middle	53.89%	Junior	19%
		Caucasian	51.93%	Lower-Middle	16.11%	Senior	8%
		Hispanic/Latino	11.60%	Lower	1.11%		
		Other	13.26%				

Note: Percentages represent portions of the entire sample.

Materials

Participants were given packets (see Appendices) that contain all of the materials in the order that they were necessary for the study. The packets contained the following forms in the order listed: two informed consent forms, a form in which the participants created a code to

identify the session, a form describing autobiographical memory, a Theory of Intelligence questionnaire, and a generic questionnaire regarding demographic information.

Theory of intelligence scale (TOI scale). A three-item questionnaire developed by Dweck and Henderson (1988) was used to measure participants' theory of intelligence. The items are "You have a certain amount of intelligence and you really can't do much to change it"; "Your intelligence is something about you that you can't change very much"; and "You can learn new things, but you can't really change your basic intelligence." Participants were asked to show their degree of agreement with each item on a 6-point scale ranging from 1 (*strongly agree*) to 6 (*strongly disagree*). The rating of each of the three items was summed to get a final TOI score. The total scores on this scale range from three to eighteen. In the typical scoring, the closer to eighteen a participant's score, the more "Incremental" the participant's theory of intelligence is. The closer to three a participant's score, the more "Entity" the participant's theory of intelligence is (Hong et. al., 1999). The Cronbach's alpha value for the present study was 0.83. In the present study, the participants were not divided into Entity or Incremental groups, and the independent variable of TOI score was kept as a continuous variable during analyses.

Past research has also found high internal reliability for the TOI scale (alpha ranged from .94 to .98 for sample sizes ranging from 32 to 184.) Test–retest reliability has also been found to be high (r = .80, N = 62, over a 2-week period) (Hong et. al., 1999). The TOI scale has also established adequate validity (Hong et.al., 1999).

Procedure

Each experimental session was performed with each participant individually and lasted about twenty minutes. Each participant first read and signed two informed consent forms (Appendix A). As a result of the private nature of autobiographical memory, anonymity of the

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research data was very important in the present study. Therefore, participants were next asked to create unique four digit codes to identify their research data (Appendices B & C). Then, the participants and the researcher went over forms which described autobiographical memory. In order to make sure that the participants understood what autobiographical memories are, the researchers provided each participant with the same example of an autobiographical memory of a time he/she ate something that he/she did not like. In order to practice recalling and articulating autobiographical memories, the participants were then also asked to provide a verbal example of an autobiographical memory of a time they ate something that they did not like.

The participants were then randomly assigned to either the failure (FM) or success (SM) memory conditions in which they would recall their autobiographical memory of their experience of an academic failure or an academic success respectively. The prompts used in the present study were created by the two principal investigators. The creation of the failure and success condition prompts used in this study was guided by three criteria. Firstly, the researchers wanted the participants to write about common experiences on one topic. People, especially those attending colleges, generally have a wide variety of academic success and failure experiences, but getting a good and bad grade on a test is a common experience that mostly all students share. Secondly, memory has been found to be show temporal effects (Conway & Pleydell–Pearce, 2000). Therefore, the researchers wanted the participants to recall memories from around the same time. Accordingly, the prompt specifically instructed the participants to recall a memory from last year. The participants were not asked to recall a memory from the current semester because those students who participated in the beginning of academic year in early in September might not have taken any tests yet. Thirdly, the researchers were interested in information about participants' cognitions, emotions, and behaviors. Therefore to make certain

that the participants understood that they could write about all three of the content categories of interest to the researchers, in the prompt they were specifically asked, "To recall all remembered thoughts, feelings, and behaviors." Past research studies that explored content differences in narratives about positive and negative experiences did not control for type of memory recalled or for temporal effects.

The prompts developed based on the aforementioned criteria are as follows: In the failure condition, the participants were asked, "Please recall an experience of getting a bad grade on a test from last year. Please include any thoughts, feelings, and behaviors that you remember (Appendix D)." In the success condition, the participants were asked, "Please recall an experience of getting a good grade on a test from last year. Please include any thoughts, feelings, and behaviors that you remember (Appendix E)."

All participants typed their autobiographical memories on Microsoft Word documents on the same IBM laptop. All participants were told that they had a ten-minute time limit to write their memories, though no participants used the entire ten minutes. After typing their memories, the participants filled out the theories of intelligence scale (Dweck & Henderson, 1988) (Appendix F). The participants' responses on the scale were used as a measure of where they fell on the theory of intelligence range. Lastly, the participants filled out demographic forms (Appendix G) and then were debriefed about the study's purpose, design, and procedure verbally. They were also given debriefing forms (Appendix H) to take with them.

Coding Procedure

Both a principal investigator and a research assistant analyzed all 168 narratives manually. Both principal coders were blind to the TOI score of the participants who wrote the narratives. This was done to assure that narrative coding was accurate and not affected by the

knowledge of the participants' TOI score. All 168 narratives were analyzed in five stages. Some past autobiographical research used text analysis programs such as LIWC to analyze the narratives. Computer programs simply count words regardless of context, sentence structure, or narrative structure in which they appear (Bohanek et. al., 2004); hence, we choose to manually code the data.

In the first stage, all off-task content was deleted. The number of off task words was subtracted from total word count in order to calculate a total on-task word count. Off-task content was operationalized as words that were not related to the experience the participants were asked to recall. In the present study, the only off task words that were found in the narratives were "I remember." Off-tasks words were not included in any of the analyses of the present study.

In the second stage, the narratives were separated into proposition phrases. Proposition phrases are idea units (Buckner & Fivush, 1998). Proposition phrases generally contain at least a subject and a verb. One sentence could have more than one proposition. Multiple propositions in a sentence could be separated by conjugations, prepositions, commas, semicolons, and etc. An example of a sentence with one proposition is, "I was worried." An example of a sentence with two propositions is, "I was worried, because I did not study for the test." An example of a sentence with three propositions is, 'I was worried, because I did not study for the test or attend class lectures." The total number of proposition phrases was calculated for each narrative.

In the third stage of narrative coding, the researcher analyzed each propositional phrase to see if any of the phrases met the criterion to be a mastery-oriented cognition, helpless-oriented cognition, mastery-oriented behavior, or helpless-oriented behavior. Total number of proposition phrases for each of the four categories was tallied separately. Mastery-oriented cognition and

helpless-oriented cognition counts were also summed to create a total cognition count for each narrative. Mastery-oriented behavior and helpless-oriented behavior counts were also summed to create a total behavior count for each narrative. It is important to note that only mastery-oriented and helpless-oriented cognitions and behaviors were counted as part of total cognition and total behavior respectively. All other types of cognitions and behaviors that were found in the narratives were not counted.

In the fourth stage of narrative coding, the researcher analyzed if any of the words in the narrative met the criterion to be coded as either a positive emotion or negative emotion word. Total number of positive emotion and negative emotions were tallied respectively. Number of positive emotion and negative emotion were also summed together to form a total emotion count.

In the fifth stage of narrative coding, the word counts and phrase counts for the six sub-categories were converted to proportional data to account for the variability in the overall length of the narratives. Thus the word and phrase counts were transformed to represent the percentage of total narrative content that were referencing emotional, cognitive, and behavioral content. Emotion word counts were dived by total word count and multiplied by 100. The cognition and behavior phrases counts were divided by total proposition phrase count and multiplied by 100. In total there were 9 percentage values (mastery-oriented cognition, helpless-oriented cognition, total cognition, positive emotion, negative emotion, total emotion, mastery-oriented behavior, helpless-oriented behavior, total behavior).

The researchers were also interested in exploring whether the Entity and Incremental theorists differed in how mastery-oriented or helpless-oriented the cognitive and behavioral content was, as well as in how positive or negative their affective content was. To meet this aim, the data for each content category was analyzed separately. A TOI index for each index value

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was created by dividing the total occurrence count for each subcategory by the total occurrence count for the entire category. Therefore, we divided the number of positive and negative emotion words by total emotion count respectively, divided the number of mastery-oriented and helpless-oriented cognitions by total cognition phrases respectively, and divided the number of mastery-oriented and helpless-oriented behaviors by total behaviors respectively. In total there were six TOI index values, one for each subcategory (mastery-oriented cognition, helpless-oriented cognition, positive emotion, negative emotion, mastery-oriented behavior, helpless-oriented behavior).

To summarize, by calculating these two types of data values for each dependent variable, the percentage that each dependent variable was of the overall narrative content and its content category (index values) could be determined. Through these two sets of values, the two main types of research questions of the current study could be addressed: Does TOI predict the percentage that each dependent variable is of the total narrative content? Does TOI predict the mastery- and helpless-orientation of the cognitive, affective, and behavioral content in the narratives?

Coding Criteria.

Emotion. To code for Dweck's affective variable, narrative emotional content was operationalized as any words referencing feelings or emotional behaviors (e.g., crying). The two sub-categories for emotions in Dweck's model were positive and negative emotions. The coding system for emotionality words was adapted from Buckner and Fivush (1998). Each emotion word was counted as one emotion word count. Each modifier on the emotionality words was also coded as an emotion word count. For example, "happy" was counted as one emotion word count, while "very happy" was counted as two emotional word counts. Examples of positive

emotion words which were coded include happy, excited, smiling, satisfied, hopeful, and enjoyment. Examples of negative emotion words which were coded were words referencing failure, depression, hopelessness, despair, anxiety, and crying.

Cognition. The content category of cognition was operationalized as phrases that referenced the participants' thoughts (e.g., Today was a good day.) Cognitions were operationalized as phrases instead of words because individual words do not generally signify thoughts, but rather the complex interplay of words working together in phrases signify thought processes. No previous study has coded autobiographical memories for mastery-oriented or helpless-oriented thoughts; hence, in the present study the coding schema was developed by the principal researchers. The coding scheme was based on the operationalizations of these dependent variables in Dweck's model (Dweck & Leggett, 1988). According to Dweck's model, mastery orientation is characterized by a belief that a person gets better at things through effort and practice, an intrinsic motivation to learn for the sake of learning, and the use of self-regulated thoughts and behaviors to master tasks (Dweck & Leggett, 1988). Contrastingly, a helpless-orientation is characterized by a belief that one is helpless to change a bad outcome, and by destructive coping in which people ruminate about their bad performance and give up trying instead of focusing on strategy development and implementation.

In the current study it was postulated that holding either orientation would lead to different interpretations of their experiences. The criterion for a phrase to be counted as mastery-orientated cognition was that it demonstrated a positive or constructive outlook about the experience, lessons learned, skills gained, positive evaluations of self, effort, and preparedness, intrinsic motivation, interest, and mental coping strategies in which they would try to make themselves feel good about their performance (e.g., remembering that they did above average).

Some examples of mastery-oriented cognitions are as follows: "I have learned that hard work does pay off"; "I should start going to office hours next week"; "I am going to watch less television the weekend before my exam"; "I can get a good grade if I study".

The criterion for a phrase to be counted as helpless-orientated cognition included a demonstration of a negative or destructive outlook about the experience such as ruminating about how badly they performed, worrying about the impact that performing poorly will have on the test and/or class, and blaming the teacher for not teaching well, being unfair, or making the tests too difficult. Some examples of helpless-oriented cognitions are as follows: "I should not even waste my time studying, because I am too stupid to get a good grade"; "My teacher does not know how to teach"; "I will probably get the worst grade in the class"; "I am the biggest failure in my family"

Behavior. The third content category to be coded was behaviors. Behaviors were operationalized as phrases that referred to actually taking actions to prepare for the test or cope with the results. Behaviors were operationalized as phrases because individual words do not generally signify behaviors; rather the complex interplay of words put together in phrases and sentences signify behavioral processes. No previous study has coded autobiographical memories for mastery-oriented or helpless-oriented behaviors; hence, in the present study the coding schema was created by the researchers. Once again, the coding schemas were based on the operationalizations of the behavioral dependent variables in Dweck's model (Dweck & Leggett, 1988).

Behaviors were subdivided into mastery-oriented behaviors and helpless-oriented behaviors. Mastery-oriented behaviors were operationalized as phrases that referred to constructive behaviors related to mastering the test material and doing well on the test, as well as

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actions taken to positively cope with the test and grade. Examples of mastery-oriented behaviors were studying, getting tutoring, going to office hours, and reaching out to a member (s) of their support system to celebrate, de-stress, or vent. Helpless-oriented coping behaviors were operationalized as phrases that referred to deconstructive behaviors that were related to avoiding preparing for the test as well as actions taken to negatively cope with the test and the grade. Examples of helpless-oriented coping behavior are avoiding studying or preparing by engaging in such activities as drinking, watching television, not going to class, and not paying attention.

Inter-rater Reliabilty

Inter-rater Reliability. Both the principal coder and a research assistant coded all 168 narratives with a 95 % inter-rater reliability. It is important to note that inter-rater reliability over-estimates reliability as a result of chance similarities in the coding of both coders. Inter-rater reliability was used in the current study because the narratives were manually coded. Each coder analyzed the narratives separately and then compared counts for each sub-category by dividing the total agreement count by the total occurrence count. The total agreement count was the total counts for all dependent variables that both coders had in common. The total occurrence count was created by adding the number of words and phrase counts that both coders had in common, and any additional counts that only the principal coder had, and any additional counts that only the secondary coder had. All disagreements were resolved through discussion.

Data Analysis

The independent variable of type of memory (success vs. failure) recalled is nominal; thus, an analysis of variance (ANOVA) was conducted to assess if there was a main effect of type of memory recalled for any of the dependent variables. The independent variable of TOI score is a continuous variable; therefore, regressions were used to determine if TOI score

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predicted any of the dependent variables. Two sets of simple linear regressions were performed. The first set of regressions was performed to assess if TOI predicted the percentage that each dependent variable was of the total narrative content. The second set of regressions was performed to assess if TOI predicted how much of their total cognitive and behavioral content was mastery- and helpless-orientated, and how much of the total affective content was positive and negative.

Results

The present study had two independent variables and 11 dependent variables. The two independent variables were TOI score and type of memory recalled (failure verses success memory). The independent variable of TOI score, a scale variable, is the sum of each participant's responses on the TOI measure (Dweck & Henderson, 1988). The independent variable of type of memory recalled is a nominal variable with the two levels of failure memory condition and success memory condition. The dependent variables of the current study were the contents of the memories; specifically, they were positive emotion words, negative emotion words, total emotion words, mastery-oriented cognition phrases, helpless-oriented cognition phrases, total cognitions phrases, mastery-oriented behavior phrase, helpless-oriented behavior phrases, and total behavior phrases. It is important to note that in the analyses actual counts of the dependent variables were not used, but rather, as previously explained, the percentages that the dependent variables were of the overall content of the narrative were used. The results for the independent variable type of memory recalled are presented first because one of the reasons that the analyses for type of memory recalled were performed was to aid in the interpretation of any impacts that TOI had on the affective, cognitive, and behavioral content of autobiographical memories about failure and success experiences.

Type of Memory

Emotions. ANOVA results revealed a significant main effect of type of memory recalled on overall emotional words, $F(1,166) = 7.22$, $p = 0.008$, partial $\eta2 = 0.04$, a small to medium effect. There was more overall emotion in success narratives, on average, than in failure narratives. There was also a significant main effect of type of memory recalled on positive emotion words, $F(1,166) = 87.84$, $p < 0.001$, partial $\eta2 = 0.35$, a large effect. There was more

positive emotion in the success narratives, on average, than in the failure narratives. There was also a significant main effect of type of memory recalled on negative emotion words, $F(1,166) = 51.81$, $p < 0.001$, partial $\eta2 = 0.24$, a large effect. There was more negative emotion in failure narratives, on average, than in success narratives. Therefore, people were more emotional overall and reported more positive emotions when remembering their successes than when remembering their failures, but cite more negative emotions when remembering their failures than when remembering their successes. See Table 3 for all mean and standard deviation information.

Cognitions. ANOVA results revealed a significant main effect of type of memory recalled on overall cognitive phrases, $F(1,166) = 10.38$, $p = 0.002$, partial $\eta2 = 0.06$, a medium effect. There was more overall cognition in failure narratives, on average, than in success narratives. There was also a significant main effect of type of memory recalled on mastery-oriented cognitive phrases, $F(1,166) = 9.79$, $p = 0.002$, partial $\eta2 = 0.06$, a medium effect. There was more mastery-oriented cognition in success narratives, on average, than in failure narratives. There was also a significant main effect of type of memory recalled on helpless-oriented cognition phrases, $F(1,166) = 50.34$, $p < 0.001$, partial $\eta2 = 0.23$, a large effect. There was more helpless-oriented cognition in failure narratives, on average, than in success narratives. Therefore, people reported more overall cognitive phrases and helpless-oriented cognition when remembering their failures than when remembering their successes, but cite more mastery-oriented cognition when remembering their successes than when remembering their failures. See Table 3 for all mean and standard deviation information.

Behaviors. ANOVA results revealed that the main effect of type of memory recalled on total behavioral phrases was not significant, $F(1,166) = 0.47$, $p = 0.496$, partial $\eta2 = 0.00$. There was a significant main effect of type of memory recalled on mastery-oriented behavioral phrases,

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$F(1,166) = 11.46$, $p = 0.001$, partial $\eta2 = 0.07$, a medium effect. There were more mastery-oriented behavioral phrases in success narratives, on average, than in failure narratives. There was also a significant main effect of type of memory recalled for helpless-oriented behavioral phrases, $F(1,166) = 10.37$, $p = 0.002$, partial $\eta2 = 0.06$, a medium effect. There were more helpless-oriented behavioral phrases in failure narratives, on average, than in success narratives. Therefore, participants used more mastery-oriented behavioral phrases in their narratives when remembering their successes than when remembering their failures, and more helpless-oriented behavioral phrases in their narratives when remembering their failures than when remembering their successes. See Table 3 for all mean and SD information.

The main effect of type of memory recalled on total words, $F(1,166) = 2.67$, $p = 0.104$, partial $\eta2 = 0.02$, and on total phrases, $F(1,166) = 2.53$, $p = 0.114$, partial $\eta2 = 0.02$ were not significant. See Table 3 for all mean and SD information.

Table 3. Means (and Standard Deviations) for Narrative Variables by Type of Memory Recalled

Narrative Variable		Failure Memory	Success Memory
Emotions	Total	3.07 (2.35)	4.71 (4.12)
	Positive	0.54 (0.82)	3.86 (3.27)
	Negative	3.78 (2.27)	1.58 (1.62)
Cognitions	Total	41.8 (17.5)	33 (17.8)
	Mastery	13 (13.3)	21 (16.9)
	Helpless	28.2 (17.4)	12.5 (11.3)
Behaviors	Total	17.2 (11.9)	18.5 (12.7)
	Mastery	9.66 (9.63)	15 (12.7)
	Helpless	7.61 (9.45)	3.52 (6.59)
Other	Total Phrases	22.6 (10)	20.2 (9.81)
	Total Words	173 (71.8)	154 (75.5)

Note: For the content categories of emotions, cognitions, and behaviors, these are not counts but rather percentages of the overall narrative content.

*$p < 0.05$. **$p < .01$. ***$p < .001$

Theories of Intelligence

The TOI score is a continuous variable that ranges from 3 to 18. The closer a participant's score is to the higher end of the range (i.e., 18), the more "Incremental" their TOI is; the closer a participants' score is to the lower end of the range (i.e., 3), the more "Entity" their TOI is (Dweck & Henderson, 1988). Two sets of simple linear regressions were used to analyze whether TOI scores predicted either the percentage each of the dependent variables was of the total occurrences of its own content category (i.e., total affective words, total cognition phrases, and total behavioral phrases) and total narrative content (i.e., total words and total phrases) .

Percentage of content category/TOI index values. The first set of regressions was performed to assess if TOI predicted how much of their total cognitive and behavioral content was mastery- and helpless-orientated, and how much of the total affective content was positive or negative. These analyses were performed for the data from both the success and failure conditions. Regressions in this series were performed on these indexes to assess if TOI scores predicted mastery-oriented cognition, helpless-oriented cognition, positive affect, negative affect, mastery-oriented behavior, and helpless-oriented behavior in the narratives from both the success and failure conditions.

Failure narratives. TOI significantly predicted the percentage of the total behavioral content that was mastery-oriented, $\beta = .33$, $t (85) = 2.96$, $p = .004$, $R^2 = .11$, a small to medium effect, and helpless-oriented, $\beta = -.33$, $t (85) = -2.96$, $p = .004$, $R^2 = .11$, a small to medium effect. The results suggest that individuals' with high TOI scores' (Incremental Theorists) behavioral content from their failures narratives was more mastery-oriented than individuals with

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low TOI scores (Entity Theorists). The results also show that individuals' with low TOI scores (Entity Theorists) behavioral content from their failures narratives was more helpless-oriented than individuals with high TOI scores (Incremental Theorists). However, TOI did not predict the percentage of the total cognitive content that was mastery orientated, $\beta = .15$, t (85) = 1.39, $p = .168$, $R^2 = .02$, a small effect, and helpless orientation, $\beta = -.15$, t (85) = -1.39, $p = .168$, $R^2 = .02$, a small effect. TOI also did not predict the percentage of total emotional content that was positive, $\beta = .12$, t (85) = 1.15, $p. = .252$, $R^2 = .02$, a small effect, and negative, $\beta = -.12$, t (85) = -1.15, $p. = .252$, $R^2 = .02$, a small effect.

Success narratives. The regression results revealed that TOI did marginally predict the proportion of total emotional content that was positive emotion, $\beta = -.21$, t (81) = -1.91, $p = 0.06$, $R^2 = .04$, a small effect, and negative emotion, $\beta = .21$, t (81) = 1.91, $p = 0.06$, $R^2 = .04$, a small effect. The results evidence that individuals with low TOI scores' (Entity Theorists) affective content from their success narratives was more positive than individuals with high TOI scores (Incremental Theorists). The results also evidence that individuals with high TOI scores (Incremental Theorists) affective content from their success narratives was more negative than individuals with low TOI scores (Entity Theorists). However, TOI did not predict the proportion of total cognitive content that was mastery-oriented, $\beta = -.03$, t (81) = -0.27, $p = .788$, $R^2 = .00$, no effect, or helpless-oriented, $\beta = .03$, t (81) = 0.27, $p = .788$, $R^2 = .00$, no effect. TOI also did not predict the percentage of total behavioral content that was mastery-oriented, $\beta = -.06$, t (81) = -.49, $p = .623$, $R^2 = .00$, no effect and helpless-orientated, $\beta = .06$, t (81) = .49, $p = .623$, $R^2 = .00$, no effect.

Percentage of narrative. The second set of regressions was performed to assess if TOI predicted the percentages that each dependent variable was of the total narrative content. From

these analyses, only one statistically significant finding emerged in the failure memory condition, and one marginally significant finding in the success memory condition. Regarding the first finding, TOI linearly predicted mastery-oriented behavior in the failure condition, $\beta = .29$, t (85) $= 2.75$, $p = .007$, $R^2 = .08$, a small to medium effect. Mastery-oriented behavior was a bigger part of the Individuals' with higher TOI scores (Incremental Theorists) failure narratives than of individuals with lower TOI scores (Entity Theorists).With respect to the second finding, TOI marginally predicted negative emotion in the success memory condition, $\beta = 0.21$, t (81) $= 1.96$, $p = .054$, $R^2 = 0.05$, a small effect. In the success memory condition, negative emotion was a bigger part of the individuals' with higher TOI scores (Incremental Theorists) success narratives than of individuals with lower TOI scores (Entity Theorists). All others regressions that were run on the success and failure narratives for all the dependent variables were insignificant. See Table 4 for information about all the regression results for these analyses.

Table 4. Regression Coefficients for TOI score, by narrative type

		β	R^2	t	P	
			Failure Memory			
	Variables	β	R^2	t	P	
Cognition	Mastery	0.15	0.02	1.35	0.182	
	Helpless	-0.14	0.02	-1.26	0.212	
Emotion	Positive	0.04	0	0.36	0.72	
	Negative	-0.14	0.02	-1.28	0.203	
Behavior	Mastery	0.29	0.08	2.75	0.007	**
	Helpless	-0.11	0.01	-0.99	0.323	
			Success Memory			
		β	$R2$	t	p	
Cognition	Mastery	-0.1	0.01	-0.91	0.366	
	Helpless	-0.02	0	-0.14	0.89	
Emotion	Positive	-0.03	0	-0.28	0.78	
	Negative	0.21	0.05	1.96	0.054	^
Behavior	Mastery	0.06	0	0.5	0.621	
	Helpless	-0.09	0.01	-0.79	0.4343	

Note: Failure condition df = 85, and success condition df = 81.

^$p < 0.06$. *$p < 0.05$. **$p < .01$. ***$p < .001$

Discussion

The aim of the current study was to explore the cognitive, affective, and behavioral content differences between narratives based on the type of memory recalled and the theory of intelligence score of the participant. In regards to type of memory recalled, the results of this study demonstrated cognitive, affective, and behavioral differences between success and failure narratives. In regards to TOI score, the results of the study demonstrated affective and behavioral differences between the narratives of people with higher TOI scores (participants who were more "Incremental") and people with lower TOI scores (participants who were more "Entity"). No significant cognitive differences were found between the narratives of people with higher and lower TOI scores.

Though participants were not split into Incremental and Entity groups, for the purposes of clarity and ease of representing the results, the results will be discussed as what they infer about Entity and Incremental Theorists. Scoring high on the TOI scale infers Incremental TOI; thus for the findings that TOI score linearly predicts a DV, it will simply be stated that Incremental Theorists have higher amounts of that DV than Entity Theorists. Similarly, scoring low on the TOI scale infers Entity TOI; thus, for the findings in which TOI score inversely predicts a DV, it will simply be stated that Entity Theorists have higher amounts of that DV than Incremental Theorists. The discussion for the independent variable type of memory recalled are presented first because one of the reasons that the analyses for type of memory recalled were performed was to aid in the interpretation of any impacts that TOI had on the affective, cognitive, and behavioral content of autobiographical memories about failure and success experiences. In the following discussion, we will review the findings and implications in the order identified in the hypotheses and aims sections of the introduction.

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Cognitions

    Type of memory. The hypotheses that, on average, success narratives would contain more mastery-oriented cognitive phrases than would failure narratives and that failure narratives, on average, would contain more helpless-oriented cognitive phrases than success narratives were supported in the current study. The hypothesis that failure narratives would also contain more overall cognitive phrases than success narratives was also supported.

    The results of the current study reveal that narratives about successes tend to contain more positive and constructive cognitions that failure narratives; whereas, narratives about failures tend to contain more negative and destructive thoughts than narratives about successes. In accordance with intuition, these findings suggest that people tend to think more positively about their successes than their failures, and more negatively about their failures than their successes. Additionally, we also found that that failure narratives tend to contain more overall cognitions than success narratives; this finding is consistent with past research that has also found that narratives about negative experiences contained greater cognitive processing words than did success narratives (Bohanek et.al, 2004; Fivush et.al, 2002; Fivush et.al, 2008). This finding suggests that people "think" about their failure experiences more than they "think" about their success experiences.

    An adaptive feature of the human mind is that it utilizes different mechanisms to psychologically cope with experiences. One means of coping is by engaging in higher order processing, which leads to more meaningful and coherent autobiographical memories about experiences (Pennebaker, Kiecolt-Glaser, & Glaser, 1988). According to D'Argembeau (2008) successes and failures are events that cause people to positively or negatively evaluate

themselves. In order to cope with the aversive effect of negatively evaluating themselves, individuals might be engaging in higher order processing (or metacognitions) of their failure experiences in order to reflect on how and why the event happened. Our explanation is only a hypothesis, future research should explore if thinking about an experience has a coping affect.

Past research has only found that positive and negative narratives differ, on average, in the *amount* of cognitive processing words (Bohanek et.al, 2004; Fivush et.al., 2002; Fivush et.al., 2008). The findings of the present study add to past literature, because we examined differences in both the amount of total cognition and the type of cognitions (mastery-oriented verses helpless-oriented) found in the narratives about positive and negative experiences.

Theory of Intelligence. We found no evidence in the current study that TOI scores predicted the cognitive content of either success or failure narratives. We had hypothesized that, on average, in their narratives about failures, mastery-oriented cognition would be a greater percentage of Incremental Theorists' total narrative content than of Entity Theorists' total narrative content; whereas helpless-oriented cognition would be a greater percentage of Entity Theorists' overall narrative content, on average, than Incremental Theorists' overall narrative content. Lastly, we had also hypothesized that, on average, in their failure narratives, mastery-oriented cognition would be a greater percentage of Incremental Theorists' total cognitive content than Entity Theorists' total cognitive content; whereas helpless-oriented cognition would be a greater percentage of Entity Theorists' total cognitive content than Incremental Theorists' total cognitive content. None of these hypotheses were supported. There were also no significant differences between the cognitive content between each theorists narratives from their success experiences, but no such differences were hypothesized.

According to Dweck's model, while performing a task, Incremental Theorists tend to have more constructive reactions to failures than Entity Theorists (Dweck & Leggett, 1988). In the current study, we did not find any statistical differences regarding how mastery-oriented or helpless-oriented both types of theorists' cognitions about their success or failure experiences.

The lack of significant cognitive differences between both types of theorists could have been a result of individuals' natural tendencies to cognitively process their experiences. Results of the current study suggest that people generally think about and process their failure experiences more than their success experiences. Thus intelligence theorists of all kinds might process and cope with their failure experiences through time, and this might diminish the cognitive differences between them that might have been present during and immediately following the negative events. This is just a hypothesis that future work should explore, perhaps by collecting cognitive data both during and a few months after participants perform badly on a task. This would lend insight into the ways that individuals interpret their experiences and feel about them at the present time, and how this interpretation may be related to later reconstructions of the experience in future narrative descriptions of these same events. Additionally, it would also be interesting to explore if both types of theorists differed in how much they think about their failure and success experiences, and how much they have coped with them through time.

Additionally, our operationalizations of mastery-oriented and helpless-oriented cognitions were very broad. Future research should explore if individuals' TOI leads them to have different *types* of negative cognitions. For example, Entity Theorists might ruminate on how external factors such as a teacher's bad teaching style or the class difficulty caused their failure; whereas, Incremental Theorists might ruminate on what they did wrong and what they could have done better in order to avoid the failure. Also, Entity Theorists' narratives might

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contain harsher self-evaluations, on average, than in Incremental Theorists' narratives. Future research should explore if this hypothesis is true.

Affect

Type of memory. The hypotheses that, on average, narratives about failure experiences would contain more negative emotionality than would narratives about successes, and that narratives about successes, on average, would contain more positive emotionality than would narratives about failures were supported. We had further predicted, however, that failure narratives would contain greater overall emotion words, on average, than success narratives, but this expectation was not supported. In fact, we found that success narratives contained greater overall emotion words, on average, than did failure narratives.

The finding that success narratives tend to contain greater overall emotion words contradicts some past research that has found that narratives about negative experiences are more emotional than are narratives about positive experiences (Fivush et. al., 2002; Fivush et. al., 2008). However, the reason for this contradiction may lie in the coding scheme used to analyze the memories. Most of the past work that reports more emotionality in memories about negative experiences (as compared to narratives about positive experiences) coded emotional words as part of a larger content category that also included cognitive processing words (e.g., Fivush et. al., 2002; Fivush et. al., 2008); however, when emotions and cognitions are coded as separate and mutually exclusive categories (e.g., Sales et. al., 2003), as was done in the current study, more emotional content appears to be reported in narratives about positive rather than negative events. Therefore, analyzing the emotional and cognitive content in the same category might have led to different findings than those found in the present study.

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Another finding of the current study might shed light on why narratives about successes contained more overall emotion, on average, than narratives about failures. As described above, participants tended to think about and process their failure experiences to a greater extent than they did their success experiences. As such, it is my hypothesis that the greater cognition in the failure narratives signifies that they have processed their experiences at a higher level, and thus might have already dealt with their experience. As a processing their experience, they might now be more detached or emotionally distanced from their failure, and therefore are not as emotional about them at the time of recall. Related research has also found that the emotional content from memories for negative emotional experiences appears to fade faster than positive emotional experiences (reviewed in Walker, Skowronski, & Thompson, 2003). Future research should explore these possible links further by collecting affective information both immediately and a few months after performing badly on a task. Immediately after an experience, are people more emotional about their successes or failures? Through time, what are people more emotional about? Do people's emotions about successes and failures fade at varying degrees?

Theories of intelligence and affective content. The results of this study revealed that contrary to our hypotheses, on average, the failure narratives of Incremental and Entity Theorists did not differ significantly in positive or negative affect. However, though we did not hypothesize any affective differences in the success narratives, we did have some marginally significant findings. We found that Entity Theorists' affective content tended to demonstrate a positive orientation compared to Incremental Theorists, while Incremental Theorists' affective content tended to demonstrate a negative affective orientation compared to Entity Theorists. We also found that negative emotions were a bigger percentage of Incremental Theorists' success narratives than Entity theorists' success narratives, but the narratives of both types of theorists'

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success narratives contained similar percentages of positive emotion. Taking these findings together, both types of theorists differ in affective orientation specifically because negative emotions play a bigger part of Incremental Theorists' stories about their successes than of Entity Theorists' stories.

In summary, our results suggest that Entity Theorists feel more positively about their experiences then do Incremental Theorists. According to Dweck's model, success validates Entity Theorists' fixed level of intelligence (Dweck & Elliot, 1988; Dweck & Leggett, 1988). Incremental Theorists, on the other hand, don't appear to view experiences of success this way; to them, success signifies that they have learned enough to perform well (Dweck & Elliot, 1988; Dweck & Leggett, 1988), not that they are "smart" per se. Therefore, Entity Theorists' affective content from their success narratives might demonstrate a positive orientation and their success stories might contain less negative emotions than Incremental Theorists, because they are more positively impacted by success. Contrastingly, Incremental Theorists might not be as positively impacted, because though it shows that their hard work was fruitful, a success does not validate a permanent quality. This was the first study to find that Entity Theorists demonstrated more positive emotion

Though affective differences were hypothesized to exist between Entity and Incremental Theorists in their narratives about getting a bad grade, no such differences were found. This is consistent with past research that has also demonstrated that the affective intensity of autobiographical memories fades more rapidly for negative than for positive events (reviewed in Walker, Skowronski, & Thompson, 2003). It could be that through time because negative affect fades faster, the differences that might have existed immediately after an experience might have also faded.

Moreover, once a failure experience is over and they have "failed," and the experience is in the past, both types of theorists might both feel badly about it, but what they "do" with these feelings may differ depending upon their mastery or helpless orientation towards performance outcome attributions. But Entity Theorists might feel bad after a failure because the outcome represents having inadequate intelligence; whereas, Incremental Theorists might feel bad that even though they worked hard, they still failed. Thus, they both might be feeling bad, but for different reasons. Future research should explore this hypothesis and asses if both types of theorists differ in what about failing makes them feel bad.

According to Dweck's model, Entity and Incremental Theorists demonstrate differing affective reactions to their failures, but similar reactions to successes. Though past research has found that Incremental Theorists tend to self-report experiencing more positive emotions regarding their experiences in the classroom (Shih, 2011), and about their college GPAs (Robins & Pals, 2002) than Entity Theorists, this was the first study to find differences in how both types of theorists feel about successes.

Behavior

Type of memory. In the current study the hypotheses that, on average, success narratives would contain a greater percentage of mastery-oriented behaviors than failure narratives, and that, on average, failure narratives would contain a greater percentage of helpless-oriented behaviors than success narratives were both supported. This is the first narrative research that explored behavioral differences in autobiographical memories of positive and negative experiences. The results of this study suggest that different types of behaviors are reported in memories about successes and failures. When people recall their success experiences, they tend

to recall more "mastery oriented" or constructive behaviors in which they spent effort in trying to achieve their goals than when they recall their failure experiences. When people recalled their failure experiences, they tended to recall more self-handicapping behaviors in which they did not set forth efforts to achieve their goals than when they recall success experiences. Though these are seemingly intuitive findings, they nonetheless add to narrative research because this is the first study to explore and to find differences in the behavioral content of success and failure memories

Theories of intelligence. The results of this study supported our hypotheses that, on average, Entity Theorists' behavioral content from their failure narratives would be more helpless-oriented than Incremental Theorists' behavioral content from their failure narratives. Our hypotheses that, on average, Incremental Theorists' behavioral content from their failures narratives would be more mastery-oriented than Entity Theorists' behavioral content from their failure narratives was also supported. Though past research has found that Incremental Theorists are more likely than Entity Theorists to take advantage of a real (Nussbaum and Dweck, 2008) and hypothetical (Hong et. al., 1999) opportunities to improve their skills on material that they have previously not performed well in, this was the first study to directly explore differences in how both types of theorists behaviorally react when they face success and failure experiences in their personal lives. Our results suggest that in their failure experiences, both types of theorists do act differently. Compared to Entity Theorists, more of Incremental Theorists' recalled behaviors in their failure narratives tended to relate to the actions that they took to prepare and study for the exam. Contrastingly compared to Incremental Theorists, more of Entity Theorists recalled behaviors in their failure narratives tended to relate to the actions that they took to avoid or destructively cope with preparing for the exam. Our results support the behavioral postulates

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in Dweck's TOI model that Incremental Theorists demonstrate mastery-oriented behavior and Entity Theorists demonstrate helpless-oriented behavior when faced with challenges.

Furthermore, our hypothesis, that on average, a bigger part of Incremental Theorists' narratives about their failure experience would be mastery-oriented behavior compared to Entity Theorists was also supported. The results of the current study suggest that the actions that they took to prepare and to do well on the test was a bigger part of Incremental Theorists' stories of their failure than it was of Entity Theorists' stories. This finding can be explained in the light of past research that has found that Incremental Theorists attribute their failures to their efforts more than do Entity Theorists (Hong et al., 1999). As a result of Incremental Theorists' greater likelihood of attributing effort as causing their failures, they might believe that their behaviors have a bigger role in their stories of failing. Contrastingly, as a result of Entity Theorists' lower likelihood than Incremental Theorists of attributing their failures to their own efforts, maybe Entity Theorists see their mastery-behaviors as a smaller part of their failure narratives when compared to Incremental Theorists. This is just our hypothesized explanation, future research should code the narratives for attributions and locus of control to better interpret these differences.

Lastly, our hypothesis, that on average, a bigger part of Entity Theorists' narratives about their failure experiences would be helpless-oriented behavior compared to Incremental Theorists was not supported. This finding suggests that helpless-oriented behavior, on average, was similar parts of both types of theorists' failure narratives. Hence, helpless-oriented behavior was similar parts of both types of theorists' stories of their failure. These findings also shed light on the previously discussed findings that both types of theorists differ in their orientation of the behavioral content found in their failure memories. Though helpless-oriented behavior, on

average, are similar percentages of both types of theorists failure narratives, both types of theorists, on average, differ in the percentage of their failure narratives that is mastery-oriented behavioral content; hence, both types of theorists demonstrate contrastingly orientations as a result of the amount of mastery-oriented behavior that is found in their failure narratives.

As previously mentioned, performing TOI research utilizing the research method of autobiographical memory provides a new perspective to understand the impact of TOI. One of the proposed functions of autobiographical memory is that it is has a bidirectional relationship with shaping and maintaining identity (Bluck, 2003). People pay most attention to and recall things that are consistent with their identities (Markus, 1977). Thus, the current findings might suggest that Incremental Theorists associate their identity with acting in a self-regulating manner in which they put forth efforts to meet their goals; thus that is the type of behaviors that they pay most attention too and recall in their memories. Contrastingly, Entity Theorists might associate their identity with acting in a helpless manner in which they do not set forth effort to meet their goals, thus this is the type of behaviors that they pay most attention too and recall in their memories. Future research should explore if both types of theorists differ in the types of behaviors with which they identify.

Furthermore, a second related function of autobiographical memory is that it is directive (Bluck, 2003). According to the directive function, people look back on their experiences as a guide to how they should act. Thus, if Incremental Theorists recall acting in a mastery-oriented way in the past, then this might guide them in the present to act in a mastery-oriented way. Similarly, if Entity Theorists recall acting in a helpless-oriented way in the past, then this might guide them in the present to act in a helpless-oriented way. Thus the relationship between people's autobiographical memory and how they act and pay attention to in their experiences is

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complex and should be explored through future research. This can be done by assessing the participants' behaviors while they perform a task, and then asking them to recall the autobiographical memory of that experience a few months later.

Additionally, Dweck's model proposes that both types of theorists do not act differently in their success experiences (Dweck & Leggett, 1988). The results of the current study also supported this postulate because there were no significant behavioral differences between both types of theorists in the mastery or helpless orientations of their recalled behaviors or in the percentage of their narratives that each type of behavior was.

Limitations

A limitation of the current study is that because TOI was not experimentally manipulated, no causal relationships can be established. Additionally another limitation is that though in the current study all participants were recalling the same type of memory, participants were not recalling the same exact event. Differences in the importance and intensity of the experiences that the participants were writing about might have impacted the results.

In the current study, simple linear regressions were used to analyze the TOI data, and thus the participants were not split into Incremental and Entity Theorists groups during analysis. If they were split into groups, there would have been 138 Incremental Theorists and 30 Entity Theorists (according the scoring rubric of the TOI scale, Dweck & Henderson, 1988). According to Dweck's model, 40 % of the population holds an Entity TOI and 40% holds an Incremental TOI. However, this was not the distribution we had in the current study; based on the TOI scale, 80% of the population would be Incremental Theorists, while only 20% would be in an Entity Theorist group. Thus, another limitation of the current study was the unequal split between

Entity and Incremental Theorists. The unequal split is hypothesized to have occurred as a result of the student body from which participants came—a medium-sized parochial school with small class sizes. It is a possibility that as a result of individualized support and the opportunity to get to know professors and peers in an intimate setting, students might have been more likely to develop an Incremental TOI in such a setting. Also, perhaps Incremental Theorists are more likely to self-select into this kind of college environment. Future research should explore what factors impact the type of TOI individuals have, and the TOI breakdown of different types of universities.

Conclusion and Implications

This was the first study that combined the two different sub-fields of psychology: autobiographical memory and Theories of Intelligence research. The results of the current study added to the literature of both fields.

Past narrative research has explored content differences in internal state language (words that reference cognitions and emotions) between narratives about general positive and negative experiences. In the current study, we took this line of work one step further and we collected narratives about academic success and failures (specific types of positive and negative experiences). In much of the past narrative research, cognitions and emotions were analyzed in the same category. We added to past narrative research because we not only analyzed cognitions and emotions in separate categories, but we also analyzed the narratives for different types of cognitions and emotions (i.e., mastery-oriented (positive) and helpless-oriented (negative)). Additionally, we also analyzed the narratives for two different types of behaviors (i.e., mastery-oriented and helpless-oriented). The findings of the current study regarding content differences

between autobiographical memories of getting a good grade (academic success condition) and getting a bad grade (academic failure condition) were that failure narratives tended to contain more overall cognitions, helpless-oriented cognitions, negative emotions, and helpless-oriented behaviors than success narratives; whereas, success narratives tended to contain more overall emotions, mastery-oriented cognitions, positive emotions, and mastery-oriented behaviors than failure narratives. These findings suggest narratives about successes and failures contain different types of cognition, emotions, and behaviors. Additionally, they also suggest that when recalling their past experiences, people, on average, think about their failures more than their successes, and that, on average, they are more emotional about their successes than their failures.

The results of the current study also added to the TOI line of research. This was the first study to assess cognitive, affective, and behavioral differences between Entity and Incremental Theorists regarding both their failure and success experiences in one study. In the current study, both Entity and Incremental Theorists were asked to recall an autobiographical memory of either a time they received a good grade or a bad grade on a test. In the current study, though we did not find significant cognitive differences, we did find significant affective and behavioral differences between both types of theorists. Regarding affective differences, we found that when recalling their successes, Entity Theorists' affective content tended to be more positive than Incremental Theorists affective content, that Incremental Theorists affective content tended to be more negative than Entity Theorists, and that a bigger part of Incremental Theorists narrative about their successes was negative emotions compared to Incremental Theorists. These affective findings add a new perspective to TOI research. Most of the differences proposed in Dweck's model are proposed to exist when both types of theorists experience failures. This was the first study to find affective differences between both types of theorists regarding their successes;

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hence, by using autobiographical memory, we were able to assess differences in how both types of theorists feel about their successes in retrospect. Traditionally, in TOI research, it is the Incremental TOI that is associated with positives; this is the first study to find that holding an Entity TOI can also have a benefit that it makes people feel happier about their successes.

Regarding behavioral differences, we found that when recalling their failures, Incremental Theorists behavioral content tended to be more mastery-oriented than Entity Theorists' behavioral content, Entity Theorists' behavioral content tended to be more helpless-oriented than Incremental Theorists, and that a bigger part of Incremental Theorists narrative about their failures was mastery-oriented behavior compared to Entity Theorists. These findings support Dweck's proposition that Entity and Incremental Theorists act differently in their failure experiences. This was the first study to assess differences in the types of behaviors that both types of theorists make when they face failures in their own lives.

Challenges are an inherent part of life, and thus Entity Theorists' proclivity to act helplessly when facing challenges can cause them to not reach their own academic and professional goals. Dweck has created teaching tools that have helped students to develop the Incremental TOI. Thus, for Entity Theorists who wish to develop mastery-oriented behavior in the face of academic challenges, it can be beneficial for them to try such methods to change their mindset.

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Informed Consent Form

<u>Title of Study:</u> Mindset Memory

Before agreeing to participate in this research study, it is important that participants read the following explanation of the study. This informed consent describes the purpose, procedures, benefits, risks, discomforts, and precautions of the study.

<u>Researcher's Affiliation</u>

Sejal Brahmbhatt is a graduate student in the Experimental Psychology program at Seton Hall University and is conducting this study for completion of her master's thesis. This study is under the advisement of Dr. Janine Buckner, Associate Professor and Director of Graduate Studies in the Department of Psychology at Seton Hall University.

<u>Purpose and Duration</u>

The purpose of this study is to investigate differences in how people interpret their experiences and consequently recall its memories. The study will last approximately 30 minutes.

<u>Description of Procedure</u>

In this study, each participant will complete several questionnaires on which he/she will report demographic data (such as age and gender), self-esteem information, and their theories and goals in academic situations. Participants will then be asked to recall and write specific memories on Word documents.

<u>Instruments</u>

Participants will be asked to take Dweck's Theories of intelligence scale (Dweck & Henderson, 1988) which contains questions regarding the participants beliefs about intelligence, and Dweck's Goals Scale (Dweck, 2003) which contains questions regarding what type of goal motivate the participants in achievement settings. Participants will also be asked to take the Rosenberg Self-Esteem Test (Rosenberg, 1965) which contains questions regarding the participant's self-esteem.

<u>Voluntary Nature</u>

Participation in this study is voluntary. If a participant feels discomfort and wishes to discontinue, he/she may do so at any time by notifying the experimenter. At that time, their participation in the study will end and their information will be discarded. A decision to end the study will not result in any penalty to the participant.

<u>Anonymity</u>

Data will remain anonymous and will only be identified by a unique code that will be randomly assigned to the participant. This code will not be associated with the participant's name, so no one will be able to link the data to the participant.

<u>Confidentiality</u>

All data will remain confidential and will be combined with others' data for analysis, such that each participant's individual data cannot be identified. In addition, data will be stored on a USB memory key in a locked, secure physical site in the Human Research Participants Lab in Jubilee Hall. Only the principal investigator in this study, Sejal Brahmbhatt, and her adviser, Dr. Janine Buckner, will have access to this data.

Extent of Confidentiality

No individual data will be reported, and results of this study will also be presented in group form. Access to the data will be restricted to the principal investigator, Sejal Brahmbhatt, or her adviser, Dr. Janine Buckner.

Discomfort and Risks

There are no foreseeable risks or discomforts associated with taking the questionnaires or writing of the personal narratives. The participants should not experience any stress.

Benefits

The study will not benefit participants directly; however, data collected from the study will be used to gain a better understanding of how individual differences affect written narratives.

Compensation

There is no monetary compensation associated with this study. Participants in this study who are currently enrolled in Introduction to Psychology will receive half of a research credit applied to this class.

Referral

This study is not expected to cause undue stress. If a participant does feel extreme discomfort, it may be helpful to speak to a friend, family member, or professional at a counseling center. The University Counseling Center can be reached at (973) 761-9500. Participants are responsible for all costs of treatment.

Alternates

Participation in this study is voluntary. If a professor offers course credit for participation in this experiment, he or she may also offer a non-experiment alternative for course credit.

Contact Information

Principal Investigator:	Faculty Adviser:	Institutional Review Board:
Sejal Brahmbhatt	Janine Buckner, Ph.D.	Mary F. Ruzicka, Ph.D.
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Audio and Video-Tapes

No portion of this study will be audio or video-taped.

Consent

Participants will receive a signed and dated copy of this form.

By signing this form, participants certify that they have read and understood the above material, and all questions have been answered to their satisfaction. They agree to participate, and realize that they may withdraw this consent at anytime without fear of prejudice or penalty. In addition, they certify that they are at least 18 years old.

_____   _____

Subject (Print Name and Sign)   Date

Appendix B

<u>Code Selection</u>

Choose a secret code number to identify yourself. Your code should consist of the following in the order listed:

1. **4 random numbers** - To avoid numbers that other people might choose, you should not use personal numbers such as your phone number, zip code, or birth year. Also, do not put numbers in a sequence (e.g., 1234, 5678, 2468.)

2. your **mother's initials**

3. **FM**

Secret Code examples: My mother's initials are LB. Thus examples of secret codes I might choose is 8356LBFM or 3195LBFM.

Write YOUR Code Number here: _____

You MUST write the secret code you selected here on every page of this packet that you write on and on all WORD documents you use.

Appendix C

Code Selection

Choose a secret code number to identify yourself. Your code should consist of in the order listed:

4. **4 random numbers** - To avoid numbers that other people might choose, you should not use personal numbers such as your phone number, zip code, or birth year. Also, do not put numbers in a sequence (e.g., 1234, 5678, 2468.)

5. your **mother's initials**

6. **SM**

Secret Code examples: My mother's initials are LB. Thus examples of secret codes I might choose is 8356LBSM or 3195LBSM.

Write YOUR Code Number here: _____

You MUST write the secret code you selected here on every page of this packet that you write on and on all WORD documents you use.

Code: _____

Memory Prompt:

Please describe with as much detail as possible your experience of getting a bad grade last year.

Please include all remembered thoughts, feelings, and behaviors.

Appendix E

Memory Prompt:

Please describe with as much detail as possible your experience of getting a good grade last year.

Please include all remembered feelings, cognitions, and behaviors.

Appendix F

Theories of Intelligence Scale – Self Form for Adults

This questionnaire has been designed to investigate ideas about intelligence. There are no right or wrong answers. We are interested in your ideas.

Using the scale below, please indicate the extent to which you agree or disagree with each of the following statements by circling the *one* number that shows how much you agree with it.

1. You have a certain amount of intelligence and you really can't do much to change it.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

2. Your intelligence is something about you that you can't change very much.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

3. You can learn new things, but you can't really change your basic intelligence.

1	2	3	4	5	6
Strongly Agree	Agree	Mostly Agree	Mostly Disagree	Disagree	Strongly Disagree

Code: _____

Demographics Questionnaire

Please fill in or answer each question below. Your data will remain confidential and will only be identified by your individual participant code.

Information about yourself:

Age: _____

Gender (circle one): M   or   F

Year at Seton Hall (circle one):   1st   2nd   3rd   4th   Other _____

Ethnicity:

American Indian	_____
Asian American	_____
African American	_____
Caucasian	_____
Hispanic/Latino	_____
Other	_____

Social Economic Status:

Upper	_____
Middle- Upper	_____
Middle	_____
Lower-Middle	_____
Lower	_____

Do you have corrected vision?   Y   or   N

      If so, did you remember to bring your glasses/contacts?   Y   or   N

Are you currently sick with an illness or taking any medication that affects your vision, level of attention, or other cognitive abilities?   Y   or   N

Do you have dyslexia or any other conditions that may affect your ability to read from a short distance?   Y   or   N

Please characterize your typing skills below:

1. Circle one: I am …   faster than most people   slower then most
    average

2. How does your typing compare to your friends: faster   slower   same

3. Are you comfortable using a computer to type?   Yes / No

4. If no, why?

_____

_____

_____

Appendix H

Debriefing
Participant Debriefing

Title: Mindset Memory

Principal Investigator: Sejal Brahmbhatt (Sejal.Brahmbhatt@student.shu.edu)

                                Graduate Student, Experimental Psychology

                                Seton Hall University

Faculty Adviser: Janine P. Buckner, Ph.D. (Janine.Buckner@shu.edu)

                                Associate Professor, Director of Graduate Studies

                                Seton Hall University

This information is being provided to you because you participated in research involving human participants.

Purpose of the Research:

The purpose of this study was to investigate the effects that Theories of Intelligence (TOI), specifically Incremental and Entity TOI, have on an individual's interpretation and performance on both easy and challenging tasks in academic settings. In this study, information about participants' experiences with both types of tasks was collected in the form of their autobiographical memories.

This study had four different conditions based on the type of Theory of Intelligence the participants personally held (Incremental or Entity) and the type of task that they were asked to recall (Easy task or Challenging task). The present study measured narrative differences through three independent variables, which were participant cognition, affect, and behavior.

Design

In this study, each participant was asked to complete several questionnaires on which he/she reported demographic data (such as age and gender), self-esteem information, and their theories and goals in academic situations. Participants were then asked to recall and write specific memories in academic settings involving either an easy or challenging task.

Materials

- **Theories of intelligence scale** (Dweck & Henderson, 1988).
This is a measure designed to assess Theory of Intelligence. The measure contains questions regarding the participant's beliefs about intelligence. Participants will be asked to show their degree of agreement with each item on a 6-point Likert scale ranging from 1 (*strongly agree*) to 6 (*strongly disagree*).

If you have any questions about the study or how your data will be used, please contact the principal researcher, Sejal Brahmbhatt, at Sejal.Brahmbhatt@student.shu.edu

Please do not discuss research procedures and hypotheses with anyone who might participate in this study, as this could affect the results of the study.

Thank you for your participation in this study!