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Story Processing & Its Effects on Memory

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The purpose of this study was to compare survival processing to narrative, or story, processing. Survival processing is a type of semantic memory processing where our brain remembers words that can have an impact on our survival. In our study, we wanted to know if story processing would yield similar or better results as survival processing. There were 110 undergraduate psychology students from the University of Mississippi that participated in the study. They were separated into three conditions and then they rated the words based on their instructions. The results of the study showed that our hypothesis was correct. The story processing results were greater than survival processing.

The phenomenon being investigated in this experiment is survival processing and narrative processing. Survival processing is thought to be a semantic memory processor because the difficulties that our ancestors faced has somehow been imprinted on our memory. Survival processing is thought to improve memory, because when words are shown that can impact our own survival, our brain can recall those words better than other type of processing words. Narrative processing is a process where a story is made out of a list of words to be remembered. Our goal in this experiment was to find out if narrative processing could improve memory.

The following are different articles that have talked about survival processing.

In the experiments conducted by James S. Nairne, Josefa N. S. Pandeirada, and Sarah R. Thomspon, the overall goal was to determine if remembering words based on survival would have better retrieval than other semantic conditions in later tests.

There were two experiments done in this study. The first experiment had three hundred students from an introductory psychology class at Purdue University. They were then randomly split up into six groups of fifty where they did each condition on experiment one. Each individual had a list of words according to their condition. The conditions were survival (the one they wanted data from), pleasantness, imagery, self-reference, generation, and intentional. The student would rate the word on a scale from 1-5 based on the criteria for the condition (Nairne et al.). The words for survival were rated by if the word was relevant or not to survival, pleasantness was if the word was pleasant or not, and imagery was if the word could create a low or high mental image. There was self-reference, which was more towards autobiography, and it was rated by if the word could trigger a personal memory or experience. The generation condition was where the student had to unscramble the word before they could rate the

pleasantness of it and then the intentional condition was the students in that group were told they would be tested on those words, so they put in effort to remember them. All of these conditions were semantic, deep processes.

The students only had about five seconds to look at the word and then rate it and then they would do a different task in between retrieving the material. The results of this experiment were that the survival condition was better than the other conditions at memory retrieval. There were also high results for pleasantness. There were higher process rating averages for pleasantness than survival, but survival still had the better retrieval (Nairne et al.). The scientists also found out that response time cannot be factored in to the memory differences and that effort (intentional test) does not mean memory will be retrieved or retained.

The second experiment did everything the same as in the first experiment, but the participant sample was smaller and the conditions were different. There were only twenty-four students from the intro to psychology class in this experiment (Nairne et al.). They were randomly split into two groups of twelve. The words were different in this experiment because the conditions were different. There was the survival condition and then a vacation condition, which had the same requirements for survival (like food and water), but it was geared towards being at a hotel on vacation instead of fighting for survival. The participants were then given sixteen words to rate for survival and then sixteen to rate for vacation. The rest of the experiment then went exactly like experiment one.

The results showed that the survival condition still outshined the other conditions (Nairne et al.). The survival condition had higher ratings against vacation, but there was no change in the response times for either condition.

Overall, I thought this article was very interesting. It is interesting and fascinating to think that what our Neanderthal ancestors did in the past can still impact us today. This study attempted to show that humans are better at remembering words and memories that are connected to our survival. This study is one of the ways that has resulted in this conclusion. I liked this study, but I thought the sample size for experiment two could have been bigger. Experiment one had thirty people in one group and then experiment two only had twelve. I thought that was a big change and I thought it should have stayed the same to keep results consistent. Other than the sample size, I thought this was a good study/experiment. The next article is an extension of this experiment by Nairne et al.

As an extension of the experiments done by Nairne et al., Sean H.K. Kang, Kathleen B. McDermott, and Sophie M. Cohen were researching an alternative hypothesis to the retention of survival words. Their overall goal was to determine if the condition of survival would still have better retrieval against an equally arousing condition such as leading a bank heist.

In this study, there were three experiments conducted. The first one had forty-eight students from a Washington University psychology class (Kang et al.). The students were then put into three groups of sixteen for each condition. The conditions were survival, the bank heist, and pleasantness. The survival condition was where the participant had to imagine that they were in the grasslands of a foreign land and they had no food or water. They had to get the resources on their own. The burglary condition was that the participants had to lead a bank heist and they had to find partners, make a plan, and gather supplies. The pleasantness condition is the same as with Nairne. The participants would rate each word on whether it was pleasant or not pleasant. Each group got sixteen words for each condition to rate the words on a five-point scale if the word was relevant to the condition or not. After they completed this, then they would do a

distractor task for five minutes. The article did not mention what sort of task was done for this first experiment, but it just depended on what the experimenters wanted them to do. The participants then would do a free recall test that lasted ten minutes on the words. The results of this first experiment showed the experimenters that the survival condition had better memory retrieval than burglary or pleasantness did. The burglary condition did better than pleasantness, but it was still inferior to survival. They listed the different factors that could have happened such as, how "deep" the processing was, items rated higher on relevance had better retrieval, and that the time it took for the survival rating was longer than the other processes could be argued to have better performance. They then rebutted the factors because they were all deep processing tasks. The pleasantness condition had higher ratings, but lower recall/retrieval. They also noted that the time put into processing does not improve memory performance.

The second experiment had the same hypothesis as experiment one, but wanted to see if it extended to recognition memory (Kang et al.). They dropped the pleasantness condition and just had subjects do survival and burglary. The test at the end of the experiment was also a free-choice recognition test instead of recall. The participants were the same amount, from the same school, and same psychology subject pool as in experiment one, but these participants were different students.

The experiment was the same as experiment one, but the distractor task was different. The participants would play Tetris for ten minutes before they did the recognition test. This test was self-paced and the students had to look at 128 words and choose if the word was old or new. If it was old, then they had rated it earlier. If it was new, then they had not seen that word before. In the test, survival still did better than burglary on recognition (Kang et al.). There was a

computer error for six students on the rating part of the experiment and the data was lost, so burglary did better in that section, but overall survival still did better.

The last experiment was to see if the survival condition would have better retrieval if the words were used for someone else. The other conditions were self-related, so in this experiment the participants watched video clips from two movies depending on the condition. The subjects were still forty-eight students from Washington, but, like experiment two, they were new and different students. They were not a part of experiment one or two. The rest of the experiment was the same as experiment one. In the survival condition, the students would watch a ninety second video, with audio, of the movie *Cast Away,* and then they would rate fourteen words on if the word was relevant to the character's survival. In the burglary condition, they would do the same thing, but they would watch a clip from *Inside Man* and then rate those words and if they were relevant to that character's bank heist (Kang et al.). They also brought back the pleasantness condition, but no video clip for that one. After the rating, they did a distractor task of five minutes and then did a recall test again. After they completely finished, then they were asked if they had seen either movie.

The hypothesis was proven again. The survival condition continued to do better than burglary or pleasantness despite the relevance was to a fiction character and not to themselves. The recall test showed significantly higher results for survival than burglary or pleasantness. The experimenters also found out that seeing the movie or not seeing the movie beforehand did not affect the data performance of the conditions (Kang et al.).

Overall, this extension study of memory based on survival is still very interesting to me. I just find it amazing how our past ancestors still have an effect on us today. We may not be

fearful of everything that they were, but we have that predisposition to fear and survival instincts are ingrained in our memory. There were some issues that I had with the experiments though and it mainly happened in experiment two. The first issue was the distractor task. I liked how it was Tetris because that can take some concentration, but experiment one and three were five minutes and Tetris was played for ten minutes. I thought it should have been a consistent time for each distraction. My second issue was for the rating condition of experiment two. They said that they had computer errors and that six students' data was gone. This changed the condition results to burglary being better than survival. I thought that they should have done the experiment again to get that data back and redo the results to be completely accurate. I thought this was a good experiment. The series continues in this third experiment.

In a series of experiments done on memory recall based on survival, this is the third one. This study was done by Henry Otgaar, Tom Smeets, and Saskia Van Bergen. Their overall goal of the experiment was to see if recall on survival processing could be found using pictures instead of just words (Otgaar, Smeets, and Van Bergen, 2010).

There were two experiments that were run in this study. The first study had 75 undergraduate students from the researcher's home university of Maastricht University. These students were given a small amount of compensation instead of college credit, like most get. The students were then randomly put into three conditions where a between-subjects design could be used (Otgaar, Smeets, and Van Bergen, 2010). A between-subjects design is where the participants are in one condition, but not the other and the conditions in this experiment were survival, moving (moving houses), and pleasantness. The survival and pleasantness conditions had the same descriptions as usual, but moving was closely resembled to the survival condition. In the moving condition, participants had to imagine they were moving houses to a new and

foreign land and only a few months, in the scenario, to get to the house and get belongings. The participants were then given thirty pictures to remember.

The subjects had thirty minutes to complete all of the pictures for their condition. They only had five seconds for each picture. As with the other experiments on survival, the participants had to rate the pictures on a 5-point scale of relevance (if the picture was relevant or not to the condition). After they completed the task, then they played Tetris for about two minutes as a distraction. They were then given an incidental recall test that lasted ten minutes. They did not know they would be tested. Otgaar, Smeets, and Van Bergen (2010) showed there were a multitude of dependent variables that were being tested in this experiment: the ratings of the pictures, the recall, number of words (the pictures had verbal themes around them like the word "chair" and the picture is a chair), correct details when they gave a description of the picture (this was after the recall test), the amount of distortions (incorrect details), and ratings on low-versus-high arousal pictures (arousal ratings) and low-versus-high pleasure pictures (valence ratings).

The results of the first experiment showed that the students recalled more pictures in the survival condition than in moving or pleasantness. The data also showed that the rate of correct details was higher with the survival condition, moving was considerably less, and pleasantness was a little bit below moving. They also checked to see if the low-high arousal ratings had any effect on the condition recalls and they found that the arousal pictures were easier to be retrieved than the other two conditions (Otgaar et al., 2010). Their first experiment is one of the ways that survival recall advantage (where any process that has the condition of survival will surpass the other conditions because survival is recalled better) can be used on general stimuli such as pictures.

The second experiment was to address an issue in experiment one and that was the thought that survival recall is better for picture stimuli than words. To complete this experiment, Otgaar, Steems, and Van Bergen (2010) had sixty undergraduate students that did not partake in experiment one. They got financial compensation and their sessions lasted thirty minutes, like in experiment one. The method was about the same as experiment one, but with some differences. There were only two conditions now and they were survival and moving. There were also two different stimuli as well which was pictures and words. Each condition, that had thirty students in each, had fifteen pictures and fifteen words and both pictures and words had to be rated on the five-point scale of relevance. They had the Tetris distraction as in the first experiment, but they weren't told that they would have to recall the pictures and words. They also did not have to do describe the pictures as in experiment one because the test was on the difference of recall.

The results of this experiment continuing to show that the survival group remembered more than the moving group. An interesting result in both conditions helped answer the hypothesis that pictures were better recalled than words (Otgaar et al. 2010). As shown before, survival ratings were higher for words and pictures than the ratings in moving. Their overall result from experiment two was that survival pictures are better recalled, but survival words are recalled too.

Overall, this study was really cool to me. I love pictures and I believe that images can stay in your mind longer than words can. If you have an image to go with that word, then I believe you would remember it better. I liked these experiments, but the only issue/question that stuck out to me was in experiment one it was a between-subjects design but they used a within-subjects test. I don't know if I didn't understand that is what you are supposed to do or they did the wrong test. I also wondered why they did a moving condition which is low arousal compared

to survival which is high arousal. Is the next article going to be these same experiments, but with a higher arousal condition next to survival?? I think those were my only questions during this article reading. I thought this was a great experiment. The next article is still on survival processing, but adds to our ancestors and hunter-gatherers.

The experiments on memory continues in this latest study by James Nairne, Josefa N.S. Pandeirada, Karie J. Gregory, and Joshua E. Van Arsdall. This study changed a little from the survival recall. The memory was still focused on survival, but they wanted to see if we had memory imprinted on us from hunter-gatherer times. They had two goals in this experiment overall. They wanted to know if hunter-gatherer processing has better retention and recall over a control scenario and then they wanted to know if men had advantages in the hunting tasks over women and women had advantages over men in the gathering tasks.

There were two experiments done in this study. The first experiment was done with 150 participants and they were going to be split into three conditions. The first condition was gathering and the people in this condition had to imagine that they were in a tribe and they were gathering food for their people. The second condition was hunting. They imagined that they were hunters in a tribe and they had to go out and hunt big game for their people as well. The third and final condition was a control condition. Their control scenario was going on a food scavenger hunt, so the participants had to imagine that they were doing a scavenger hunt and locate food (Nairne, Pandeirada, Gregory, and Arsdall, 2009).

The participants would then look at thirty words and rate them on relevance to their condition and if they worked or not. They had five seconds to rate the words on a five-point scale. When they finished with the words, then they did a distractor task for two minutes where

they did a digit-recall. After that task, then they were told they had to do a recall test on the words they learned. This was a surprise test; an incidental test. The recall test would be split up into minutes until it was ten minutes. The participants would have to draw a line after each minute when a timer went off. This was to do a curve on the data totals, but, for some reason, the scientists didn't report that data (Nairne et al. 2009).

The results of this experiment showed that recall was significantly higher in hunter and gatherer conditions over the scavenger-hunt. The gender of the participants was put in as a factor in the data, but it didn't have any effect on the results. The results also showed that the responses took longer for the scavenger-hunt than in the hunter and gatherer conditions. This was thought to be believed that the processing was deeper for the "fitness/survival" rather than the control processing (Nairne et al. 2009). One of the big takeaways from this experiment was that, even though all of the conditions centered around food and collecting food (a big necessity of survival), memory was enhanced and recall was better when the condition directly linked to survival like with the hunter and gatherer conditions instead of just a scavenger-hunt.

The next experiment had a couple of changes from experiment one. In this experiment, there were only two conditions. There was a hunter condition (same as in experiment one), but the second condition was a control condition where the participants imagined that they were in a hunting contest. There wasn't a condition for gathering. Another change was the number of participants. Due to there being only two conditions, the number went down from 150 to 100, fifty in each group. The same words were used in this experiment as in the first one and the participants had to rate the relevance of each word according to their condition (Nairne et al. 2009).

One of the results in this experiment, which I find cool, is that the female participants recalled more words than the men in both conditions. These are hunting conditions which were thought to be a 'man's' sport, so it was cool to see that. The scientists reported that this pattern was inconsistent with the evolutionary account (Nairne et al. 2009). Men gave higher relevance ratings in the hunter condition, but women did higher in the hunting contest condition. The overall results from both experiments helped show that human memory is tuned to hold information that will help us with survival. The conditions where survival, or fitness, was tested had more recall and higher relevance than the conditions that were non-survival. There was also the result that sex did not play a factor in this. The data did not show any sex differences in recall performance. It is merely a matter of the survival scenario.

This article was fascinating to read. I've read about hunter-gatherer tribes and how in some tribes women helped with hunting if needed or if the tribe was matriarchal, but to see this experiment was cool. I thought it was neat how in experiment two the women did better than the men in the hunting conditions. There were flaws in this article though. A minor detail is that they didn't say where the participants came from. At the beginning of the article it said Purdue University and University of Aveiro, but they didn't say where the students were from in each experiment. Also, with the participants, it didn't state if the 100 participants in experiment two were the same from experiment one or if it was a new set of people. That could change the data. Third, in experiment one, they said that the participants drew a line after the last word when a minute was up so they could do cumulative recall curves, but that information wasn't on the article. Why do that if it wasn't going to be put in the article? Fourth, the p values were not significant and they shouldn't have warranted post hoc tests. In both experiments, the p value was higher than .05, so why did they say there was an effect if there wasn't. They should have

failed to reject the null. Last, the article was hard to follow in some instances. It just read weird and was hard to understand, because it felt like there were conflicting facts going on in the results section. The final article is related to our experiment and it's about narrative processing.

This last article based on memory and memory processing was conducted in 1969 by Gordon H. Bower and Michal C. Clark. As being one of the first to try this experiment, their overall goal was to see if narrating a story from a list of words would have better memory recall over just memorizing the words and then recalling those words.

There was only one experiment done in this study, but it was looking for two results. As stated above, they wanted to know if narrating, or "chaining", the words would have better recall than just repeating them verbatim. The other was seeing if the study time had any effect for either condition (Bower & Clark, 1969). There were 24 undergraduate students from Stanford University that were split randomly into two conditions. These conditions were either narrative processing or control processing. Narrative processing was where the subjects took the ten words in each of the twelve lists and made a story out of those words. The stories were short and simple, because the students only had about a minute or two to make the story and remember the important words. They repeated that process for each of the twelve lists. The control group would look at the ten words and commit them to memory. They also had only a minute or two to look at the words. There was no deep processing going on in this group.

For both conditions, there was an immediate recall test after each list (Bower & Clark, 1969). When all twelve lists were done and attempted a recall test, then each subject was asked to recall the words in the first list, the second list, and so on until the end.

The results were interesting. Bower and Clark (1969) found out that there was not any difficulty in recalling the words after each list. It is not surprising because the information was fresh in their minds. Narrative processing had a 99.9% recall and control had 99.1%. Not much of a numerical difference, but narrative processing is looking good. Memory recall of all twelve lists proved more difficult. The narrative condition remembered six to even seven times more words than the control condition. Overall, the narrative condition recalled 93% and control recalled 13%.

The second part of the results was based on study time. For the narrative condition, there was only a four percent increase between short time (88%) and long time studying (92%). The control condition had a significant increase from 12% to 41%, respectively. These short and long study times for control condition were controlled by how long the narrative condition got to make the story for their words. So, the fast narrative subjects had shorter times for control subjects and they had worse recall. The overall result was that when the narrative condition made the stories there was a "stream of consciousness" (Bower & Clark, 1969) that helped the subjects recall the words more than just critical words on a paper. These stories had personal significance to the participants. This experiment helped their hypothesis of narrative processing.

Overall, I thought this was a great experiment. It was not surprising to me that narrative processing would do well. Stories are meant to be remembered. Stories have meaning and, so, doing an experiment where you make stories out of the words to test memory was really interesting to me. I only had a couple of issues. The condition against narrative processing was not arousing enough. It was just a control condition. I wonder what would happen if narrative processing was put up against an equally arousing condition. There also wasn't a distractor task, which was weird. Of course, they would do good on the initial recall test because the information

was fresh in their minds. They didn't have a distractor task to see how shallow or deep the processing actually is. Those were my only concerns that I could see. This was great study.

In the study that we are conducting, we wanted to see how well survival processing went up against narrative processing. The participants from a freshmen psychology course listened to one of three sets of instructions: pleasantness, survival, and narrative processing. This was a between-subjects design experiment. The students then had ten minutes to list how the words would help them survive, why the words were pleasant or not, or to create a story using the words. After this, they then did a distractor task of solving multiplication problems for two minutes. They would then attempt to write down as many words as many words as they could. Our hypothesis was that narrative processing would improve memory similar to survival processing.

METHOD

PARTICIPANTS

There were 110 undergraduate psychology students from the University of Mississippi. Most were freshmen and all of the participants received partial course credit.

DESIGN

The experiment used a between-subjects design with three conditions for the participants to be placed in. The conditions were story processing, survival processing, or the pleasantness task.

MATERIALS & APPARATUS

All of the stimuli and responses presented in the experiment was used with paper and pencil/pen. The experimenters used twenty words from a category norm study (Van Overschelde, Rawson & Dunlosky, 2004).

PROCEDURE

The experiment began when participants entered the lab in small groups between one and four people. The participants would then provide consent. The experimenter then placed each participant into one of the three conditions (story, survival, or pleasantness). After being placed in the condition, the experimenter would read the corresponding set of instructions below.

*In this task, we would like you to list something **pleasant or unpleasant** about each of the words listed below.*

*In this task, we would like you to imagine that you are stranded in the grasslands of a foreign land, without any basic **survival** materials. Over the next few months, you'll need to find steady supplies of food and water and protect yourself from predators.*

*Many people find **stories** to be interesting and entertaining. Please write a short story in the space provided below and be sure to use each of the following words in your story. If you cannot think of a way to use a word in your story, please list the word at the bottom of the page beneath your story.*

Each condition group was then given ten minutes to complete the task according to their instructions. When completed and the time was up, the participants would flip their page over and do a distractor task. They worked on triple-digit multiplication problems for two minutes. Once

the distractor task was completed, then the students would attempt to remember as many words as possible from their condition. The participants, after completion, were then debriefed of what the study was about and received the credit.

Results

The independent variable in our experiment was the set of instructions that participants listened to prior to completing the task. The three conditions were: a story condition, a survival processing condition, and a pleasantness condition. To determine whether differences in memory performance occurred among conditions, we ran a One-Way analysis of variance. The result of that test was statistically significant, F (2, 87) = 28.09, $p < .001$.

Because the ANOVA result was statistically significant, we followed it up with a series of independent samples t-tests. First, we compared performance in the story condition with performance in the survival condition. The result of that test was significant, t (58) = 3.80, $p < .001$. Second, we compared performance in the story condition with performance in the pleasantness condition. The result of that test was statistically significant, t (57) = 7.39, $p < .001$. Lastly, we compared performance in the survival condition with performance in the pleasantness condition. The result of that test was statistically significant, t (59) = 3.85, $p < .001$.

Another dependent variable in our experiment was the number of intrusions. An intrusion occurs when a participant remembers a word that was not on the list. To determine whether there were any differences in the number of intrusions as a function of instructional condition, we ran a One-Way ANOVA. The result of that ANOVA was marginally significant, F (2, 87) = 2.98, $p = .056$.

Because this ANOVA result was statistically significant, we followed it up with a series of independent samples t-tests. First, we compared the number of intrusions in the story condition with the survival condition. That result was not significant, t (58) = 1.73, p = .09. Second, we compared the number of intrusions in the story condition with the pleasantness condition. The result of this test was statistically significant, t (57) = 2.23, p = .03. Third, we compared the number of intrusions in the survival condition with the pleasantness condition. The result of this test was not significant, t (59) = .43, p = .67.

Discussion

As stated previously, the main goal of this experiment was to compare survival processing to narrative processing. Survival processing is where, because of our ancestors and survival instincts, our brains are better at recalling words that could have an impact on our own survival. This type of memory processing is thought to have been imprinted on our brain since the time of hunter-gatherer days. Narrative processing is a more recent way of memory recall. In narrative processing, the brain recalls words that have been put into a story. In our experiment, we wanted to know if the narrative processing was equal to or better than the survival processing. The results did lean to support the hypothesis.

There were three scenarios in the experiment: survival, pleasantness, and story. The participants were divided into each scenario and then given a set of twenty words to remember. After ten minutes of memorization, they would do a distractor task of multiplication problems for two minutes. The subjects then had to attempt to remember the words in their scenario.

In line with earlier studies, the survival processing was greater than the pleasantness condition (Nairne et al., 2008). The survival processing continued to be greater in our

experiment. The results of both survival and story performance were statistically significant over pleasantness. We concluded in our experiment that the words were easier to recall when the participants listed examples of the scenario words instead of rating them on relevance or pleasantness (Nairne et al., 2008). All of the previously mentioned articles that were studied before our experiment had the participants rate the words on a five-point scale. This method does help in recall, but our experiment showed that listing examples to the words created better recall for each scenario. In our experiment, we used twenty words instead of the usual thirty (Pandeirada et al., 2009). The amount of words did not have a play in the performance of the conditions. The methods were the same for each condition.

Even though in every article that was studied before this experiment showed survival processing as superior to the other conditions, such as a bank heist (Kang et al., 2008), our experiment helped prove our hypothesis by showing that story processing seems to be greater than survival. The results of both of the conditions were statistically significant and the subjects showed that they could recall the story words better than the survival words.

In practical implications, our experiment on narrative processing could suggest that human memory is “tuned” to remember stories. Survival processing is thought to be so successful over other conditions because our ancestors have imprinted their survival instincts down through the generations. We are predisposed to be fearful of dangerous stimuli. We would be more afraid of a snake than a car. We know the snake will harm us if we aren’t careful. The car can harm us too, but our brains are thinking more danger toward a snake than the car. Survival processing takes on that predisposition to help memory retrieval.

Story processing is thought to be successful because of historical evidence as well. Our history was handed down orally, which means by way of mouth. There were designated storytellers in every tribe, village, town and they would tell their history through the use of stories. History was passed down to each generation, until paper came along, by telling stories. Greek mythology stories always had a grain of truth in them and people remember these parts of history because of the stories. Why do we remember the plots to books and movies? They have good stories that have the ability to be remembered.

One suggestion to help memory by using story processing is to put information into a story format. History is a good way to do this. Instead of just dates, names, and facts being thrown at students, make it a story. It does not have to be complex, but can be simple. Many students know when Christopher Columbus sailed around the world in 1492 because it was made into a short, rhyming story. It does not have to be just history that this works, it can be put into all manners of information. Just make a story.

There were some limitations in our experiment. First, not everyone completed the distractor task. For some of the students, the multiplication problems were too complex and they just did not do them. They sat there for the two minutes and then did the recall test. For future experiments, the distractor task will either be less complex or they will play Tetris. Second, some student may have spent more time studying the words in the story condition. The students in the story condition used their entire ten minutes to write the story, while the other conditions had to be told to continue writing examples of their words until the ten minutes were completed. The study time was used more efficiently in the story condition. Third, the results showed that there were more intrusions in the story condition, even if it was a marginal result. Intrusions are where the participants recalled words that were not on the list. This result makes sense because the subjects would have had to

use filler words along with the condition words to help make the story make sense. It was also a marginal result, so the amount of intrusions did not hinder the result of story processing being similar to survival processing. One future direction for this experiment in the story processing would be to use the rating system used in previous studies. In this future experiment, participants would rate how easy it would be to include the word into the story instead of actually writing the story.

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Effects of Conditions on Memory