When encoding information into memory, people not only process and store the target information, but they also process the information surrounding the target object or event. This additional information can then later help them retrieve the target and can enhance memory across a variety of situations. Among the additional information that is encoded are cues from the context in which the target memory was formed. These context effects enhance retrieval by providing additional retrieval cues for the target memory.

Perhaps one of the most striking examples of context effects is the physical context effect. In studies of physical context effects, the actual physical location of participants can influence performance. For example, Godden and Baddeley (1975) found compelling evidence for context-dependent memory when looking at divers’ memory performance either underwater or on land. They showed that word lists learned underwater were better recalled underwater than on land, and that words learned on land were better recalled on land than underwater. Similarly, Smith, Glenberg, and Bjork (1987) showed that participants who encoded and recalled a list of paired associates in the same room and setting showed better overall recall than did participants whose encoding and recall context did not match. These results provide evidence that elements of the context become associated with the target memory and can clearly improve memory performance when these elements are available during testing.

Physical context, however, is not the only type of context that is stored with the target memory. The semantics of an object or event are also encoded. Semantic context encourages participants to focus on the meaning of a target memory which can then greatly improve memory. For example, Thompson (1972) presented word pairs such as sky blue and told partici-
pants that they would be tested on the second word of each pair (e.g., blue). During testing, the researchers presented participants with either the critical word only (blue) or the word pair that they had originally studied (sky blue). Results showed that participants were more successful at recognizing the critical word when it was presented in the original word pair context than the single critical word context. Furthermore, McKenzie and Tiberghien (2004) found that if a word was presented in singular form during encoding, then participants were more likely to recognize it during the recognition test if the word was in singular form. These studies show that semantic context can also play an important role in enhancing memory.

Memory for the target material can also depend heavily on the context in which the target material is embedded. Better memory is seen if the target material is embedded in semantically-related material, in contrast to when the target material is presented by itself or when it is embedded in semantically-unrelated material. Jefferies, Lambon-Ralph, and Baddeley (2004) showed that participants have better memory for whole sentences than for single words. In this study, participants were presented auditorily with a series of sentences or a series of words, and then were asked to recall what they had just heard. Results showed that participants were able to recall auditory sentences more quickly and successfully than unrelated words. These results further showed the importance of context and indicated that items that had elements of context could be remembered more easily than items without context. Perhaps sentences provide meaningful context that can lead to connections in memory whereas lists of words are devoid of context and connections, and are therefore not retrieved as easily.

The importance of semantic relatedness of the target and non-target material can also be seen in a study by Green and Hummel (2006) in which participants determined whether a target object matched a label. Each object was presented with a distracter object which sometimes interacted with the object and sometimes did not. For example, a glass of water would be shown with either a pitcher (related) or a car key (unrelated). Participants were able to identify the relationship much more accurately when the distracter was semantically related to the label. Green and Hummel believe that the semantically-related label provided participants with an appropriate context that helped them recognize the relevant relationships. Therefore, when the distracter was semantically related, participants could better identify the relationship.

The studies reviewed above provide evidence that physical and semantic context can play an important role in memory. We designed the current experiment to expand these findings by investigating whether a common source, compared to a variety of sources, could also provide contextual cues that could lead to memory improvement. More specifically, this study was designed to determine whether participants would remember more movie quotes when they were from the same source (movie) or when they were from different sources (movies). Because the quotes from the same source had the same feel and mood, it is possible that participants would be able to use this semantic information to help them improve their memory.

However, another possibility also exists in this situation. Presenting a series of quotes that have the same source and therefore the same underlying semantic context could actually lead to poorer memory due to interference effects. Research (e.g., Brewer, 1988) has shown that participants are more accurate at remembering some unique event compared to a particular event within similar events. As participants are exposed to more similar events, specific details of each event tend to be exchanged and shared across the common events, eroding memory accuracy (e.g., Reinitz, Lammers, & Cochran, 1992; Roberts & Blades, 1998). It is possible that presenting participants with a series of quotes from the same source, and therefore the same semantic context, would lead to a decrease in detail memory compared to memory for quotes from a different source that did not share semantic context. Given these two possibilities, greater memory for the same-source movie quotes than the different-sources movie quotes would provide evidence that participants were able to use the semantic relatedness and context effects to improve their memory. On the other hand, decreased memory for the same-source movie quotes condition compared to the different-sources movie quotes condition would indicate that source similarity leads to interference and erosion of memory accuracy. Based on the compelling evidence for positive context effects reviewed above, however, it was hypothesized that participants would be able to use source and therefore semantic context to improve their memory in the same-source condition. Thus, we predicted that recall of movie quotes would be greater in the same-source condition than the different movie source condition.

Method

Participants
The participants who agreed to participate in this study were 34 students at a small midwestern liberal arts college (12 first-years, 7 sophomores, 6 juniors, and 9 seniors). Participants (13 male and 21 female) were obtained from the introductory psychology pool as well as convenience sampling. The mean age of the participants was 20.2 years.
Materials
For the same-source condition, 10 quotes from the movie Anchorman (2004) were spliced together, with approximately 1 s between the quotes. For the different-sources condition, 10 quotes from different movies were spliced together, also with 1 s between the quotes. The movies that were used were Office Space (1999), Charlie and the Chocolate Factory (2005), Mr. and Mrs. Smith (2005), Shrek (2001), Scooby-Doo (2002), Rush Hour (1998), The Fast and the Furious (2001), Men in Black (1997), The Blues Brothers (1980), and The Matrix (1999). Quotes in both conditions ranged anywhere from approximately 1 s long to approximately 4 s long. Example quotes from Anchorman included “You know I don’t speak Spanish”, “I love lamp”, and “Hey everyone! Come and see how good I look!” Example quotes from other films included “I love grapes” (Charlie and the Chocolate Factory), “Let’s go for a little ride” (The Fast and the Furious), and “We’re on a mission from God” (The Blues Brothers). The two conditions were approximately the same overall length of about 1 min. Basic demographic information was also collected.

Procedure
First, consent forms were distributed and signed. After this, participants were shown the first movie condition, then asked to recall as many of the quotes as possible. Once everyone had finished, the second movie condition was shown, after which participants were again asked to recall as many of the quotes as possible. To control for possible order effects, approximately half the participants saw the same-source condition first, while others saw the different-sources condition first. After participants recalled as many quotes as they could remember from the second condition, they were debriefed.

Design and Analysis
The research used a two-group independent-samples design. We used a paired-samples t test with a repeated factor of source (same or different) to investigate participants’ memory for quotes. Random assignment was used to assign the conditions, with 15 participants seeing the same-source condition first, and 19 seeing the different-sources condition first.

Results
No order effects were found for the same-source condition first compared to the different-sources condition first (p = .50). Therefore all results are presented collapsed across order.

To determine how movie source influenced quote memorization, we analyzed participants’ recall both for overall memory and accuracy of memory. The overall memory score was created by adding up all the quotes that participants remembered correctly. For this particular memory measure, we considered a quote to be correct if all the major words in a quote were correctly given; words such as a or the, were not considered. We ran a paired-samples t test on the overall memory measure with a repeated factor of source (same or different). We found that participants remembered significantly more movie quotes from the same movie (M = 5.56, SD = 2.39) than from different movies (M = 4.56, SD = 1.89), t(33) = 2.33, p = .03, d = .40 (see Figure 1). These findings indicate that source and therefore semantic context can influence memory for complex stimuli such as movie quotes.

To determine whether the above improvement in the same-source condition was due to an increase in accuracy or to participants’ attempts to remember more quotes in the same-source condition than in the different-sources condition, we calculated an accuracy ratio, created by dividing the number of accurate responses by number of attempted responses. Again, a response was considered accurate if all major words (all words other than a, an, and the) were written in the exact order that the words were said in the movie quote. We ran a paired-samples t test on the accuracy ratio and showed that participants had a proportionally higher level of accuracy when recalling quotes from the same movie (M = 0.83, SD = 0.20) than when recalling quotes from different movies (M = 0.69, SD = 0.20), t(33) = 3.00, p = .005, d = .70 (see Figure 2).

Discussion
This study was designed to investigate the impact of source context on memory. For the same-source condition, we hypothesized that participants would be able to use source information, such as the mood and feel of a movie, to make semantic connections to improve
their memory compared to the different-sources condition. Overall, results showed that participants were able to remember more quotes in the same movie source condition than the different movie sources condition. These findings indicate that participants are able to use source context to make semantic connections and to improve memory. Results also showed that participants were proportionally more accurate in their recall for quotes from the same source than for quotes from different sources. The accuracy results show that similarity in source context does not lead to interference or greater confusion as suggested by Reinitz, et al. (1992) and Roberts and Blades (1998). Overall, these findings indicate that source context can improve both accuracy and overall memory.

The implications of this study are far-reaching. First, the findings indicate that participants are able to use a common source as a memory aid. Perhaps a common source alerts participants to the semantic relationship between the information presented (movie quotes, in this particular experiment.) Once participants are aware of a semantic relationship between the information, they can use the relationship to help improve memory, as seen in Green and Hummel (2006). Further studies, however, are needed to investigate this possible connection between source context and semantic relationships.

The findings of this study could also have broader implications, especially for education. If source context can be used as a memory aid, as seen in the same movie condition, then educators need to be encouraged to make more direct references to source similarity. For example, when possible, try to include more references to the same source as opposed to referencing a slew of different sources; and, when referencing different sources, be sure that those sources are related. Such references should help students understand the semantic relationships between class materials and lead to improvements in memory. Additionally, if students can organize their notes into source-related units, students might be able to take advantage of another memory aid that has been shown to improve memory, chunking. The process of chunking in memory can only occur when a person realizes there is a connection between the material presented (e.g., Carter, 1998; Miller, 1956); perhaps source context leads participants to see semantic relationships that then lead to chunking. Future research needs to be done to examine the relationship between source context and the ability to use chunking.

There are some limitations that need to be considered in this study. The fact that most participants in this study had probably seen the movie Anchorman, which was used for the same-source condition, could have influenced their abilities to recall more quotes from Anchorman. If participants had heard the quotes before, then they might have been able to remember them better because of previous exposure, not because of source similarity. However, we tried to control for this by choosing movies for the different sources condition that were equally popular movies with college-aged adults (e.g., Charlie and the Chocolate Factory, 2005; Mr. and Mrs. Smith, 2005). In an informal post-hoc survey of 25 students who did not participate in the original study, we found that the average familiarity of the movies presented in the different sources condition was about equal to the average familiarity of the movie Anchorman. Though done in a post-hoc fashion, this gives us some confidence that familiarity was at least to some extent controlled for in the study. Perhaps a future study could try to eliminate familiarity by either asking them if they had seen them previously, or by performing a study with old movies from the 1940s and 1950s that most college-aged adults would not have seen before. If students are not familiar with the films, then familiarity would not be a factor, providing a purer measure of whether participants are able to use the feel and mood of a movie to determine context and the relationship between the quotes. Another extension of this research would be to investigate the limits of source context by giving participants movie quotes that are from a much broader source, such as animated movies. It would be interesting to investigate what type of source context participants are able to use to increase memory and what type of source context does not lead to an increase in memory. Perhaps a movie genre, such as quotes from animated movies only, would be too broad of a source and therefore would be more likely to lead to interference effects as participants tried to keep track of the different movies and their quotes.
References


