

**Memory Retrieval: The Effects of Retrieval-Induced
Forgetting on Tertiary Law Assessments.**

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Abstract

Empirical support for the idea that successful retrieval of momentarily wanted information depends to some extent on the inhibition of unwanted, competing information, comes from a phenomenon termed *retrieval-induced forgetting* (RIF). Current research examining the effects of *RIF* in everyday learning experiences indicates that retrieval practice strategies, which involve answering a sub-set of topic-related questions, may actually be detrimental to exam preparation. The present study examined whether law students engaging in retrieval practice of evidential facts and statute provisions in a criminal case produce *RIF*. A second research question explored whether an instruction to take a certain perspective when encoding the facts and provisions would reduce or eliminate *RIF*. Pichert and Anderson (1977) hypothesised that by imposing a perspective, the resulting high-level schema may work as an effective retrieval framework for retrieving learned text elements. A third research question examined whether requiring the retrieval practice task to be more active would result in a significant difference between the recall of the retrieval-practiced items and the unrelated items that received no retrieval practice, as was unexpectedly, *not* the case in Experiments 1 and 2. The overall findings showed the occurrence of *RIF* in the context of tertiary law exam preparation, lending support to previous studies examining the effects of retrieval practice. However, there was no support for Pichert and Anderson's schema theory relating to perspective taking. The results for Experiments 1 and 2 produced an intriguing finding that suggests that law students show a strong propensity to generate counterarguments that complement the retrieval practice items while practicing evidential facts and statute provisions in a criminal case. It appears that in contrast to university students in other *RIF* studies, the law students engage in a type of recall strategy that enhances their performance on unpracticed information when that information consists of the direct counterarguments to the arguments they are actually practicing. When the retrieval practice task was modified to reduce participants' ability to generate such counterarguments in Experiment 3, the standard *RIF* effects emerged.

1.0. INTRODUCTION

The study of law in tertiary institutions is notoriously renowned for requiring long hours of reading vast amounts of highly technical material in the hope of mastering the information well enough to pass law examinations. In order to avoid memory overload, law students have been known to ‘question spot’ (i.e., employ a best-guess heuristic as to the questions deemed most likely to be included in the exam) as a way to reduce the amount of information to be remembered. This approach involves reviewing selected law cases, followed by the practice of retrieving only certain facts in the cases, while perhaps ignoring related case facts that the student may deem unimportant. As a consequence, law students oftentimes struggle to answer exam questions that require the retrieval of these ignored related case facts. Recent research in cognitive psychology provides some illumination about why this might be common by suggesting that the act of remembering certain facts may prompt the forgetting or inhibition of ignored related facts (e.g., Anderson, Bjork & Bjork, 1994; Anderson & Spellman; 1995, Macrae & MacLeod, 1999).

The present study is aimed at exploring the practical effects of a best-guess approach to law examination questions and whether the retrieval practice of only certain law

facts is detrimental to the retrieval of the related law facts in the same case. I will begin the first subsection by reviewing the 'classical interference' theory, which examines the question of why memories ultimately fade. This is followed by a discussion of the manner in which memories fade and examines the theorised contribution that executive control mechanisms have in the inhibition of certain memories. Included will be a discussion of cognitive theories that have recently begun to unravel the intricacies of the mechanisms involved in selective memory retrieval and what happens when certain information is repeatedly retrieved, while other related information is ignored. To examine why certain memories are unable to be retrieved, Anderson, Bjork and Bjork (1994) and Anderson and Spellman (1995) reported findings that purport to show the existence of an inhibitory control mechanism and these experiments will be explored in-depth because they help to illustrate what happens to related memories. These experiments ultimately led to studies designed to explore the inhibition of related memories in the context of social psychological and other more applied phenomena (Macrae & MacLeod, 1999). The designs of the experiments conducted for my study emulate Macrae and MacLeod's work and, consequently, a discussion of their work provides a foundation for my study and predictions. Included in the introduction are several examples of the operation of the inhibitory control mechanism that show the generality of the effect that retrieval practice has on related items. These examples are in the context of eyewitness memory and situations in which misleading information is added to post-event information. The last part of the introduction will include a discussion of theories dealing with the integration of information (i.e., whether it is possible to integrate memories in such a way that repeated retrieval of only certain memories *does not* affect the retrieval of related memories). This research suggests that there are

certain conditions under which the forgetting of related items may be reduced or eliminated (Anderson & McCulloch; 1999, Dunn & Spellman, 2003; Levy & Anderson; 2002). Because my second experiment explores whether the robustness of forgetting related facts, when retrieving target facts, can be overcome by integrating the facts together, a discussion of this research provides an important framework that helps to explain the design of the second experiment.

1.1 Interference Theory

In the past, memory retrieval research has focussed primarily on the question of why memories that at one time were quite clear to an individual, eventually fade and become difficult to retrieve. The classical interference theory argued that the answer to why memories fade involves the interference and storage of new memories replacing old similar memories (Mueller & Pilzecker, 1900). For example, individuals who shop daily at a shopping mall supermarket may struggle to remember where they parked their car two weeks ago because of the clutter of newer car parking memories. However, the storage of the newest car parking memory allows them to remember where they parked their car today with relative ease. This interference theory currently remains popular and numerous memory researchers still refer to interference as the primary cause of forgetting (J.R. Anderson, 1983; Anderson, Bjork & Bjork, 1994; Atkinson, Atkinson, Smith, Bem, & Nolen-Hoeksema, 1996).

In questioning the classical interference theory assumption relating to interference causing memories to fade, Anderson (2003) explores the *manner* in which interference causes the forgetting of memories. By his account, a *process of inhibition*

exists that recruits an executive control mechanism to cause the forgetting of memories (hereafter referred to as the *inhibitory theory*). Anderson argues that it is not the storage of new memories that causes forgetting, rather forgetting whether subsidiary or intentional, is caused by the process of inhibition that is engaged because of the potential interference on new memories. The process of inhibition is the mechanism that is recruited to overcome interference in memory retrieval by actively inhibiting competitors to a target memory. This *inhibitory theory* is in contrast to the common view in memory research that forgetting is the result of the constantly changing structure of the memory from the addition of newer memories, and that the forgetting of memories is simply a passive side effect of storing new memories.

An examination of executive inhibitory mechanisms in the control of physical action may help to illustrate the fundamental purpose of inhibitory mechanisms in selective memory retrieval (Anderson, 2003). Control of physical action refers to an individual's ability to control his or her physical behaviour by overriding a habitual response or reflex in a situation that demands an unusual or weaker response. For example, if an object were accidentally knocked off a table, an automatic response by an individual would be to attempt to catch the object before it breaks on the floor. However, if the object is a boiling cup of coffee, an attempt to catch this object could result in a serious burn, hence, an overriding response needs to be engaged to avoid a potentially dangerous situation (e.g., third degree burns to the hand and arm). According to Anderson, an executive inhibitory process is recruited to override and inhibit habitual responses, which then facilitates the engagement of a more appropriate response, such as allowing the boiling cup of coffee to fall to the floor.

This assumes that a habitual response stems from an initial stimulus activating a stimulus representation in long-term memory (e.g., an object falling from the table). This in turn activates a series of associated responses (e.g., either catch the object before it reaches the ground, this would normally be the stronger associated response or let the object fall to the ground). When a stimulus has several associated responses, the response with the strongest association to the stimulus would normally be the one to reach a response-threshold first and become the activated response. In a situation where the weaker response is the more appropriate response (e.g., letting the object, the boiling cup of coffee, fall to the ground) an inhibitory mechanism is recruited to prevent the stronger response (e.g., catch the hot cup of coffee) from reaching the response threshold first.

Anderson (2003) argues that with regard to an executive inhibitory control mechanism, there are strong parallels between the control of action and the control of memory. Similar to a stimulus activating a representation in long-term memory and in turn activating an associated motor response or several associated motor responses, a memory retrieval cue may activate a representation in long-term memory leading to the retrieval of an associated item or associated items. Comparable to our need to prevent oneself from carrying out certain habitual motor actions when inappropriate (e.g., catching a boiling cup of coffee), there may be situations in which the retrieval of a certain memory is inappropriate and consequently an inhibitory mechanism is recruited to override more strongly associated memories and allow a weaker association to prevail. Alternatively, there may be associated memories that an individual may wish to avoid altogether, due to the nature of the memory (e.g., an experience of childhood sexual abuse), and therefore an inhibitory mechanism is

recruited to prevent the associated memory from entering into consciousness (Anderson & Green, 2001).

This analogy between control of action and control of memory may be especially applicable in selective memory retrieval. When attempting to recall a target event, a retrieval cue may activate several associated memories, some of which may hold a stronger association than the actual target item to be retrieved. With several strongly associated memories competing for access to consciousness, a target item could potentially be lost unless some form of inhibitory control mechanism is engaged that allows the contextually appropriate target to prevail over the stronger associations. Recent research appears to support the existence of an inhibitory control mechanism in selective memory retrieval (Anderson, Bjork & Bjork, 1994; Anderson & Spellman, 1995; Macrae & MacLeod, 1999).

1.2 Retrieval-Induced Forgetting

For most university students, impending final exams are a time when the mind is overflowing with facts and information necessary for the successful completion of assessment. It is at this time of year that other aspects of life are sometimes overlooked, such as car registration or perhaps a friend's birthday. With regard to these failures of memory retrieval, a reasonable question to ask is whether these aspects of life are merely overlooked or whether they are actually forgotten or somehow inhibited at the expense of dealing with information deemed higher in priority (Shaw, Bjork & Handal, 1995). Anderson, Bjork, and Bjork (1994) suggest that occasionally we are limited in the information that is readily accessible and,

hence, it is sometimes necessary to forget bits of information in order to remember other information. The successful retrieval of momentarily wanted information that depends to some extent on the inhibition of unwanted, competing information, comes from a phenomenon termed *retrieval-induced forgetting* (RIF).

RIF refers to the suppression of potentially interfering items that are in competition with a sought after target item in memory. For example, to retrieve a friend's new phone number from memory, a person might momentarily need to inhibit the old phone number in order to make the wanted number more accessible. A consequence of suppressing such interfering items, however, could be the future impairment of the same items in a recall task. *RIF* is supported by results from retrieval tasks involving semantic memory, long-term episodic memory, eyewitness memory, misinformation effects, and implicit memory, all of which are to be discussed later (Anderson, Bjork & Bjork, 1994; Anderson & Spellman, 1995). A discussion of these retrieval tasks and their results illustrates how the recent research in *RIF* supersedes many of the assumptions of the classical interference theory and highlights the differences between the two approaches.

A fundamental assumption of the *inhibitory theory* relates to the predicted memory impairment for the associated memories to a target memory. The effect of suppressing or inhibiting these associated memories/competitors over time may result in the memory impairment for these competitors. As mentioned earlier, Anderson, Bjork and Bjork (1994) termed this effect '*retrieval-induced forgetting*' after completing experiments using a retrieval practice paradigm, which explored the effects that repeated practice on target items has on related items. Findings from recent memory

retrieval research examining the effects of retrieval practice on related memories appear to support the inhibitory control prediction (Anderson & Spellman, 1995, Macrae & MacLeod, 1999).

For example, to test the existence of an inhibitory control mechanism on the retrieval of both episodic and semantic performance, Anderson and Spellman (1995) developed a task termed the “independent probe technique”. Episodic retrieval refers to the retrieval of information related to a specific event that has occurred in a person’s past, whereas semantic retrieval refers to the retrieval of more generic factual knowledge about objects or events. Their technique included a learning phase, a retrieval practice phase, a distracter phase and a final test phase. In their episodic memory retrieval task, participants studied several categories (e.g., the colour Red or Food) with attached exemplars (e.g., Red-Blood, Food-Strawberry) in the learning phase and then commenced retrieval practice on half the categories in the retrieval practice phase. During the retrieval practice phase, participants were instructed to retrieve from the named category, the exemplar that matched the specified letter (e.g., Food – Str___). After a twenty-minute interval, participants were shown category labels (e.g., Red or/and Food) and asked to recall as many exemplars as they could.

The design used two different types of retrieval classifications, practiced versus non-practiced. The practiced classification (Rp categories) had two types of exemplars, the first exemplar received retrieval practice (Rp+, practiced items from practiced categories) and the other did not (Rp-, unpracticed items from practiced categories). The unpracticed classification involved categories that did not receive any retrieval practice (Nrp categories, unpracticed items from unpracticed categories). Non-

retrieval practice categories had two types of exemplars, a Nrp-similar item (similar to the Rp- item) and a Nrp-dissimilar item (dissimilar to the Rp- item). To test the effects of retrieval practice, Anderson and Spellman compared final test performance of the Rp+ items with performance on the same items when these items were placed in the Nrp categories. In their first experiment, the independent probe technique used by Anderson and Spellman included a related condition and an unrelated condition (see Figure 1 for an example of the independent probe technique).

Independent Probe Technique

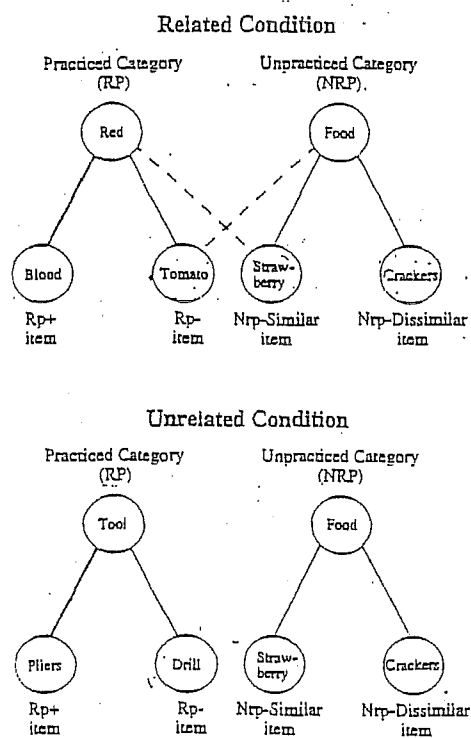


Figure 1. Independent Probe Technique adopted from Anderson & Spellman (1995).

The related condition involved categories that contained similar exemplars such as Red-Tomato and Food-Strawberry. In contrast, there was no relationship between the exemplars of categories in the unrelated condition (e.g., Tool-Drill and Food-Strawberry). The unrelated condition provided a baseline performance measure to show the difference between the recall performances of the Rp+ items versus the Nrp similar items from both of the conditions. The baseline measure allowed for further evidence of *RIF*.

Anderson and Spellman (1995) argued that the *inhibitory theory* predicts cross-category inhibition and thus in the above example of the related condition, retrieval practice of Red-Blood should impair Strawberry (Nrp similar item). Although Strawberry is semantically linked to Red, Strawberry was studied under another category cue, (i.e., Food). In contrast, Rp- items in the unrelated condition were not expected to impair the recall of Nrp similar items. For example, Tool (Rp category)-Pliers (Rp+ item) was not expected to impair Food (Nrp category)-Strawberry (Nrp similar item). Hence, it was predicted that there would be a higher percentage of recall of Nrp *similar* items in the *unrelated* condition compared to that of recall of Nrp *similar* items in the *related* condition. The outcome revealed that indeed the recall of Nrp *similar* items in the *related* condition was significantly impaired relative to the recall of the same items in the *unrelated* condition, and this supported their prediction regarding inhibitory control in this situation.

To counter arguments that non-inhibitory mechanisms rather than inhibitory mechanisms are responsible for the forgetting of related items, Anderson & Spellman (1995) designed experiments to show *RIF* properties that could be supported by the

inhibitory theory. For example, their experiments showed that the forgetting of related items is cue-independent. That is to say, that the impaired recall of related items will continue even when the related items receive other test cues. Anderson (2003) argues that cue-independence exists because only the inhibited related item is impaired and not any particular association. Anderson and Spellman established this point in one of their experiments by using category exemplars a second time with different category cues. For example, participants receiving retrieval practice on Red-Blood (Rp+ item) showed significant impairment for the related item Red-Tomato (Rp- item). However, the participants still showed impaired recall for Tomato when Tomato received the novel category cue of Food-Tomato (Rp+ item) indicating that the effects of *RIF* are cue-independent.

1.3 Other examples of Retrieval-Induced Forgetting - Eyewitness Memory

In addition to the *RIF* research establishing cue-independence and other inhibitory properties in episodic and semantic performance, memory researchers have established that an inhibitory control mechanism is recruited to deal with interference relating to meaningful stimuli, such as witnessing criminal events. Due largely to Elizabeth Loftus's controversial investigations into pseudomemories, the topic of eyewitness testimony is increasingly becoming an area of concern for the judicial system in Western societies. When a serious criminal event takes place, such as a murder, generally any eyewitnesses to the event are repeatedly questioned by different sectors of the judicial system including lawyers, police and occasionally judges. However, although eyewitnesses are questioned at length, the questioning is not always comprehensive and the questions frequently depend on what the sector's

specific objective is (e.g., the police under pressure to make an arrest). Importantly, the repeated retrieval of only certain facts may result in the inability of an eyewitness to retrieve related facts at a later stage that may be critical to providing a fair and just defence for the defendant or facilitate prima-facie evidence for the prosecution to make a conviction. Using a combination of Shaw and Bjork's (1995) eyewitness paradigm, wherein participants complete retrieval tasks involving the recall of stolen items from one of two categories of items subject to robbery, and the retrieval practice paradigm, MacLeod (2002) examined *RIF* in a new context applicable to eyewitness memory.

Participants in MacLeod's (2002) first experiment were instructed to take the perspective of a police officer investigating two separate home burglaries in which several items were stolen from both House A and House B. The stolen items from each house consisted of four electrical items (e.g., a microwave oven) and four non-electrical items (e.g., a mirror), totalling sixteen items. The participants were initially exhorted to pay attention to the series of sixteen slides that displayed the individual stolen items. Following the study phase, the retrieval practice phase required participants to complete questions about four of the viewed items (either electrical goods or non-electrical goods) from the source of one of the two categories of the stolen items (either House A or House B), and these four items provided the *Rp+* items (practiced items from a practiced category). The related items to the *Rp+* items provided the *Rp-* items (unpracticed items from a practiced category) and a second category of items provided the *Nrp* items (unpracticed items from an unpracticed category). Performance for the *Rp+* items was significantly greater than the *Nrp* items

and performance on the Nrp items was significantly greater than performance on the Rp- items, indicating that *RIF* had occurred.

Even more relevant to the present study, MacLeod's second experiment was an attempt to replicate as realistically as possible a real-life condition whereby eyewitness testimony would be elicited. When individuals witness a criminal event in real-life, they are not expressly instructed to remember the facts of the event as they are occurring, hence, there is an implicit element in an individual's strategy to organise relevant information about a criminal event. In contrast, most studies of *RIF* tend to provide the explicit relevant information for participants to encode. Therefore, MacLeod examined whether the phenomenon of *RIF* would occur in a situation where a participant needed to encode information with an implicit organisational strategy. Rather than display a series of individual stolen items, as was the case with Experiment 1, participants viewed two different scenes with two different women, one blonde woman (category 1) and one brunette woman (category 2). The scenes depicted the two women collecting money from private homes for a bogus charity and each scene displayed ten items that were *not* expressly identified in individual slides. Similar to Experiment 1, in the retrieval practice phase the participants answered questions about five of the items from one of the women's scenes, providing the Rp+ items. The related items from the same scene provided the Rp- items, with the ten items from the other woman's scene providing the Nrp items. As with Experiment 1, the results from Experiment 2 showed that the recall of Rp+ items was significantly greater than the Nrp items and the recall of the Nrp items was significantly greater than the recall of the Rp- items. This again shows the robustness of *RIF*, in that express instruction to organise information is not necessary for it to occur. Moreover,

it lends support to more realistic occurrences of forgetting related facts during repeated retrieval of a subset of those facts – a situation that closely parallels the reporting of eyewitness testimonies.

1.3a Retrieval-Induced Forgetting in Misinformation Effects

Another research domain relevant to eyewitness testimony indicates that an inhibitory control mechanism is recruited to inhibit and weaken the recall of original facts connected to an eyewitness event when misleading post-event facts are introduced (Saunders & MacLeod, 2002). The ‘misinformation effect’ has played a major role in the investigation into pseudomemories (Loftus, 1979; Loftus & Hoffman, 1989; Loftus, Millar & Burns 1978). This effect refers to an individual’s susceptibility to recall misleading information that is introduced in a post-event discussion about an event that has occurred. The effect of recalling misleading information may be contrasted with recalling the original information witnessed from the event. In an article examining the different theories relating to the underlying mechanisms that produce ‘misinformation effects’, Saunders and MacLeod argue that the phenomenon of *RIF* contributes to this distorted memory effect. As part of their study, Saunders and MacLeod re-examined earlier research conducted by Loftus et al., (1978) regarding false memories.

To establish the relative ease of implanting false memories, Loftus et al., designed a ‘misinformation effect’ task whereby participants are instructed to answer a post-event questionnaire about a previously witnessed incident. Note however, that the questionnaire typically used is not designed to elicit comprehensive retrieval of event

details. Instead, it concentrates on providing retrieval practice for only a subset of the original facts of the event. This could in turn result in the inhibition of related information about the event. Moreover, this inhibited information, resulting from *RIF*, may receive additional distortion from the questionnaire with the introduction of misleading information, thus further compounding the ‘misinformation effects’. For example, let us say that the original witnessed event includes a situation where police officers see a getaway car with three bank robbers stopped at a railway crossing. A critical question might be “Did the police officers see three or four occupants inside the getaway car while it was stopped at the railway crossing?” To introduce misleading information, the questionnaire might refer to the ‘railway crossing’ as a ‘pedestrian crossing’. As the critical retrieval practice question actually refers to whether there were three or four occupants in the getaway car, the issue of the ‘railway crossing’ is not necessary for the retrieval of the question at hand. In accordance with *RIF*, the original memory of the ‘railway crossing’ becomes akin to an unpracticed related item and therefore an inhibited item, leaving only the post-questionnaire ‘pedestrian crossing’ memory available for retrieval. It is therefore possible that, participants answering the questionnaire will adjust their memory of the original event to include a ‘pedestrian crossing’ rather than the initial ‘railway crossing’. Under such conditions, there is disruption to the original memory and the misleading information tends to triumph. Saunders and MacLeod’s findings appear to indicate a plausible alternative to the view taken by Loftus (1979) that misleading information introduced after the original information can subsequently *overwrite* the encoding of the original material. Instead, Saunders and MacLeod provide a credible account of an inhibitory control mechanism being responsible for ‘misinformation effects’.

In an attempt to garner further support for their argument that the inhibitory mechanism underlying *RIF* is also the mechanism that produces ‘misinformation effects’, Saunders and MacLeod (2002) conducted a study using a variant of Anderson, Bjork, and Bjork’s (1994) ‘*RIF*’ paradigm. They hypothesised that if they are correct, significant misinformation effects should only occur when misleading post-event information is introduced about the Rp- items (related unpracticed items), but not when misleading information is introduced for the Rp+ items and the Nrp items. According to their logic, Rp- items are akin to associated related items and consequently the inhibitory mechanism is recruited to inhibit these potential competitors to target items, ultimately impairing their recall. Similar to MacLeod’s (2002) study, participants viewed information about two different home burglaries with the ten stolen items in each of the two homes providing the Rp+ items, the Rp- items, and the Nrp items. In a ‘misinformation phase’, a questionnaire introduced misleading information to all three types of items (Rp+, Rp-, & Nrp). The results provided strong support for Saunders and MacLeod’s hypothesis and showed that when participants recalled information about Rp- items (the previously inhibited items) they recalled the misleading information sixty percent of the time, rather than the original information. By contrast, participants recalled misleading information, rather than the original information for the Rp+ items and Nrp items, only 16% and 20% of the time, respectively. This suggests that after an initial inhibition of a related unpracticed item (the result of *RIF*) a subsequent addition of misleading information about the related item results in an exaggerated ‘misinformation effect’. This type of study has important ramifications for memory research as it indicates how *RIF* and

the inhibitory control mechanism that mediates it can actually augment the fallibility of memory in everyday life.

1.4 Social Applications of Retrieval-Induced Forgetting

Although researchers have examined the existence of an inhibitory mechanism in memory retrieval, only a limited number have attempted to test potential applications of *RIF* to real-life situations (e.g., MacLeod, 2002, Saunders & MacLeod, 2002). Recent work by Macrae and MacLeod (1999) has begun to address the potential practical applications of the *RIF* phenomenon. In agreement with the arguments put forward by Anderson and Spellman (1995), Macrae and MacLeod argued that to ensure effective functioning of memory, it seems reasonable that some type of mechanism must be employed to deal with competing representations from the same retrieval cue. In a series of experiments, they extended Anderson and Spellman's predictions about an inhibitory mechanism by examining this mechanism in the context of social cognition. Most importantly, their study attempted to answer whether the findings from Anderson and Spellman's independent probe technique can be extended to contexts that have meaningful social significance to the tested participants. After all, inhibiting memorised items of fruit is quite different from inhibiting social information that has personal relevance.

In their attempts to bring a demonstration of *RIF* closer to everyday learning experiences, Macrae and MacLeod (1999) tested participants in two different contexts, namely impression formation and examination study. The first experiment utilised four phases, a study phase, a retrieval practice phase, a distracter phase and a

final test phase. Participants studied cards conveying traits for two different men. Each card contained a man's name (e.g., Bill) and a single trait (e.g., intelligent). In all, there were ten traits for each man and the cards were divided into two subgroups of five for the purpose of practiced (Rp+ items) and unpracticed (Rp- items) sets of items. The retrieval practice phase involved participants practicing half of the traits that described one of the men. The ten traits describing the other man would be the Nrp (non-retrieval practiced) items. After the distracter task, participants were instructed to write down as many traits for both men as they could recall. Results verified that *RIF* is prominent in the social context of impression formation. This finding replicated and extended Anderson and Spellman's (1995) results in that recall performance for the unpracticed (Rp-) items was significantly impaired in comparison to practiced (Rp+) items. However, Macrae and MacLeod also pointed out that impression formations in this context might have little personal consequence for the social perceivers. A more consequential real-life situation, where the cost of forgetting is high, was therefore enlisted to establish whether *RIF* would emerge in a context with more serious implications. Hence, additional converging evidence for the *RIF* phenomenon was sought in a new context – that of a mock academic exam.

1.5 Is the repeated practice of selected information the best way to study for exams?

A study technique commonly used by many university students in preparation for exams involves the repeated practice of course-related material that the students believe to be important. The potential application of the *inhibitory theory* to such situations, however, would suggest that the repeated practice of selected information might not be the best strategy to ensure exam success. By implication from their

impression formation experiments, Macrae and MacLeod (1999) proposed that retrieval practice of selected information might actually be harmful to exam preparation. Retrieval practice should only prove successful if the student chose precisely the correct information to practice, whereas, if unpracticed information appeared in the examination, it should suffer impairment.

To test this retrieval practice prediction, the participants were presented with index cards conveying facts about two fictitious islands, Tok and Bilu. Although the procedure shared similarities with Experiment 1, a non-retrieval practice group of participants was added. This additional group was included to enable comparison of recall results from participants that engaged in retrieval practice with results from participants that did not. By including a control group, Macrae and MacLeod (1999) could test their conjecture that retrieval practice of certain information may actually be destructive to exam preparation. In the retrieval practice phase, the non-retrieval practice (control) group performed a recall task on geographical information, which was derived from a general knowledge base, such as the capital of Australia is C_____. The control group allowed Macrae and MacLeod to test the prediction that participants who performed retrieval practice would perform significantly worse on Rp- items than participants in the non-retrieval practice (control) group. As expected, the results indicated that the experimental group recall of Rp+ items was significantly greater than the Nrp items, indicating the positive effects of retrieval practice on the target items. The results corroborated the standard finding from previous research and showed that the recall of Rp+ (practiced) items was significantly higher than Rp- (unpracticed) items for the experimental group in comparison to the control group (e.g., Anderson & Spellman, 1995). It was also shown that the retrieval practice

group's recall performance of Rp- items was significantly impaired compared with that of the control group performance on the same items, supporting Macrae and MacLeod's prediction regarding examination performance. Apparently, retrieval practice strategies, such as answering topic-related questions delivered by friends, may actually be detrimental to exam preparation.

1.6 Integration of Encoded Information

Throughout this discussion, the executive inhibitory control argument has alluded to the possibility that *RIF*, through the process of inhibition, is consistently responsible for the forgetting of related items each time a target item is retrieved. However, there appear to be conditions under which *RIF* of information is either reduced or eliminated. For example, if information that is being encoded and practiced is self-relevant to an individual, the forgetting of any related items appears to be significantly reduced. Macrae and Roseveare (2002) conducted a study in which participants were instructed to memorise a number of gifts. The first group of participants were asked to imagine that they had purchased the gifts, a second group was asked to imagine that the gifts were purchased by their best friend, and the third group was asked to imagine that the gifts were purchased by an unknown person. The study tasks were based on the *RIF* paradigm, and included a retrieval practice task in which the gifts were divided into Rp+, Rp-, and Nrp conditions. Macrae and Roseveare argued that because we rarely forget personal details, such as our own phone number, our home address, or what our last job was, such self-relevant information should be resistant to temporary forgetting. It was therefore, expected that the group of participants that received the instruction to imagine that they had purchased the gifts themselves would

not suffer recall impairment of the Rp- items (unpracticed items from a practiced category) to the same extent that the other two groups would. The results supported this prediction by showing that the self-relevant condition eliminated to a significant extent the emergence of *RIF* of related items. In a similar study, Dunn and Spellman (2003) found that participants performing retrieval practice and recall tasks on stereotypical traits of different individuals suffered less impairment of Rp- items when they harboured a greater belief in the stereotype persona.

Another recent study indicated that the effects of *RIF* were significantly reduced if participants were encouraged to integrate studied category members together, and in some cases *RIF* was eliminated altogether (Levy & Anderson, 2002). Integration between conceptual facts appears to attenuate the competition between the facts allowing for increased retrieval of the facts in question. Studies involving integration indicate that by integrating facts together, there is more cohesion between the representations, which ultimately results in less interference relating to the retrieval of the facts. Therefore, the participants require the reduced use of an inhibitory mechanism and are able to retrieve more information (Anderson & McCulloch, 1999).

The work on integration by Anderson and McCulloch is reminiscent of earlier work by R.C. Anderson (Pitchert & Anderson, 1977) in the area of schema theory. Schemas describe an object or event and are represented by distinctive relations between the components/facts that are inherent in each object or event. According to schema theory, the schema employs a slot or placeholder for each component with the purpose of integrating schema facts for enhanced retrieval of available schema information (Anderson, 2000). Similar to the concept of integration allowing for

interrelationships between the available facts to form meaningful representations, the slots for each fact component in a schema allows for meaningful interrelationships between the facts of a schema.

Important early work on schema theory by Pichert and Anderson (1977) examined how taking a certain perspective when reading text results in inter-connected meaningful representations and increases the integration and accessibility of facts. They argue that when mature readers view text they will generally impose some type of personal structure or schema on the text. It is possible therefore that, the propensity to impose a personal schema on text may in some cases change the author's intended structure of the text, indicating that text structure is not an invariant concept. In addition, the perspective or high-level schemata imposed by the reader will determine the level of significance placed on the different text elements and this level of significance of text elements can change with each different perspective. Pichert and Anderson hypothesised that by imposing a perspective, the resulting high-level schema may work as an effective retrieval framework in retrieving learned text elements. Enhanced retrieval in such situations may result from the schema providing implicit cues for the text elements that are considered important to the perspective taken by the reader.

Following this line of reasoning, it is feasible to argue that by taking a self-relevant perspective when viewing complex information such as exam information, there will be meaningful integration of the text facts and consequently the effects of *RIF* may actually be reduced or eliminated. As previously seen, however, the extensive research on the phenomenon of *RIF* suggests that this effect is exceptionally robust. It

is therefore possible that, even with the addition of self-relevant perspectives attached to the encoding of exam information, *RIF* may nonetheless occur; an outcome that would support the idea that this phenomenon is highly resilient in certain memory retrieval contexts.

2.0. Research Questions & Hypotheses

University study of the law and the legal system is undoubtedly one of the most taxing disciplines when it comes to the retrieval of relevant information at assessment time. In preparing for law examinations, it is quite common for law students to be required to encode and retrieve information from hundreds of law cases. Due to the overwhelming reading requirements, many law students take a best-guess approach to their study and attempt to guess the questions that will be included in their exams. It is possible therefore, that a number of bright and talented students might fail their law assessment by an unfortunate choice of material to study. It is not uncommon for the same students that receive average grades in law assessment to receive outstanding grades in other university disciplines, so factors other than intelligence could be responsible for such failures.

Using a variant of Macrae and MacLeod's (1999) experiments, my first research question addressed whether law students engaging in retrieval practice of evidential facts and the relevant statute provisions in a fictional criminal case would produce *retrieval-induced forgetting* (RIF). The hypotheses for Experiment 1 were that the retrieval practice of the evidential facts and statute provisions would cause the participants to recall significantly more Rp+ items (practiced items in a practiced

category) in comparison to the Nrp items (unpracticed items in an unpracticed category) and significantly less Rp- items (unpracticed items in a practiced category) than the Nrp items. It was decided to include a control group in this experiment, as it was expected that a comparison between the control group and the experimental group's performance would provide further evidence of the detrimental effects of retrieval practice. Results from Macrae and Macleod's second experiment showed that the students engaging in the retrieval practice phase of geography facts, suffered recall impairment of Rp- (unpracticed) items compared with the baseline performance of the control group. It was therefore predicted, that if *RIF* occurs in this experiment, the experimental group should recall fewer Rp- items than the baseline performance of the control group. It was expected that there would be no significant difference between the experimental group's recall performance and the control group's recall performance on the Nrp items, indicating that retrieval practice has no recall effect on these items.

A second research question (explored in Experiment 2) involved whether the instruction to participants to take a self-relevant perspective when encoding the evidential facts and statute provisions would reduce or eliminate the effects of *RIF*. A self-relevant perspective refers to a perspective that individuals perceive as being particularly relevant to them because of their knowledge, skills or expertise. The specific hypothesis for Experiment 2 was that if the self-relevant perspectives were powerful enough to reduce the effects of *RIF*, the participants should recall an equal amount of Rp- items in comparison to the baseline recall performance of the Nrp items, indicating that the effects of *RIF* have been successfully reduced. However, if this was not the case and the effects of *RIF* proved to be resilient to the imposed self-

relevant perspectives, there should be impaired recall of Rp- items for both of the perspective groups.

As the participants were law students studying for a law degree, it was decided to assign job-related perspectives that were considered plausible and relevant by the participants in regards to their possible future employment in the legal system (e.g., defence lawyer, public defender, prosecutor). Therefore, one of two self-relevant legal perspectives was assigned to participants in the perspective groups. In one of the self-relevant perspectives, a *criminal defence lawyer* is representing a sibling in a criminal case where the consequence of losing the case results in the life imprisonment of the sibling. As this perspective may be deemed an unlikely or an infrequent occurrence in real life, a second self-relevant perspective was used in an attempt to test the generality of any potential effects of perspective taking in the reduction of *RIF*. This second perspective entailed a more common scenario, whereby the consequence of losing the case does not have such direct and personal implications. Participants were instructed to envision themselves as *public defenders* in the defence of the accused. If the imposed self-relevant perspectives are powerful enough to reduce the effects of *RIF*, then I predict that this finding will generalise across the different perspectives.

A third research question examined whether enhancing the retrieval practice phase of Experiment 1 and Experiment 2 of this study would produce a more significant difference between the recall performance of the practiced items in the practiced category (Rp+ items) and the unpracticed items in the unpracticed category (Nrp items). Recent research suggests that extra study exposures to study items (Rp+ items) in the retrieval practice phase of experiments examining the effects of retrieval

practice are not active enough to produce impaired recall of the unpracticed items from a practiced category (Rp- items) (Anderson & Spellman, 1995). In contrast to extra study exposures, many studies have used active probing tasks in their retrieval practice phases (e.g. the main export of Bilu is C) and have produced *RIF* (Macrae & MacLeod, 1999). It was therefore predicted that by enhancing the retrieval practice task to be more active, the participants would show a significant difference between the recall of the Rp+ items and the Nrp items, indicating the benefits of retrieval practice. The participants would also show impaired recall of the Rp- items, indicating *RIF*. A perspective group was included in this experiment to examine whether modifying the retrieval practice phase to be more active would make any difference to the recall performance of the Rp- items. It was expected that if the perspective was powerful enough to integrate the evidential facts and statute provisions, the perspective group would show a reduction in the effects of retrieval practice (i.e., *RIF*) in comparison to the non-perspective group. However, if this was not the case and the perspective failed to integrate the information, it was predicted that the perspective group would show a similar result to the non-perspective group in their impaired recall of Rp- items.

2.1 Experiment 1

Method

Participants

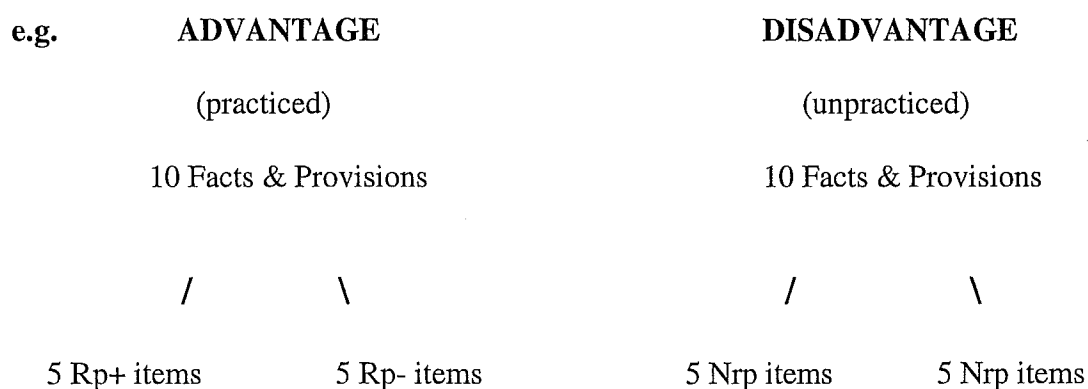
Thirty-two undergraduate law students participated as participants for this experiment. Participation was voluntary and elicited through campus flyers in the Canterbury University Law department advertising a free chocolate bar and entry into a draw for one of three dinner vouchers to a restaurant.

Procedure and Materials

The procedure emulated Macrae and Macleod's (1999) study and consisted of four phases including a study phase, a retrieval practice phase, a distracter phase and a final recall phase. Participants were instructed that they would complete a law test recalling evidential facts and relevant statute provisions about a criminal case, and that it was important that they consider the test as valid assessment. A fictitious criminal case was created to avoid any previous participant knowledge of an existing case that could contaminate the results. The fictitious case and instructions for participants are presented in Appendix A.

In the study phase, participants initially read the fictitious criminal case and were then presented with the 20 evidential facts and statute provisions related to the case (the facts and provisions are presented in Appendix B). Each of the evidential facts and statute provisions was presented for 15 seconds by way of a power point presentation. The facts and provisions were split into two categories and designed to be either an *advantage* (10 facts) or a *disadvantage* (10 facts) to the defendant (see Figure 2). In the retrieval practice phase, one of the categories was divided into two subgroups to create a practiced set (5 Rp+ items) and an unpracticed set (5 Rp- items), the other category created the Nrp items (non-retrieval practice) condition.

Figure 2.



The evidential facts and statute provisions that are of an advantage and disadvantage to the defendant were counterbalanced to ensure that the facts appeared equally as often in the Rp+ items, the Rp- items, and Nrp items. For the retrieval practice phase, the retrieval practice participants were presented with a series of power point slides to probe their recall of 5 of the evidential facts and provisions. Each of the 5 slides was presented three times in a random order, totalling 15 retrieval practice trials. In contrast, the control group engaged in a no-retrieval practice condition in which the students viewed 15 generic facts about the New Zealand legal system (e.g., the High

Court is superior to the District Court). All of the participants, after completing the retrieval practice phase, engaged in a distracter phase in which they were asked to perform basic mathematical calculations for a duration of five minutes. During the final recall phase, the participants were asked to recall as many evidential facts and statute provisions about the criminal case as they could recall (i.e., report in a written format) and they were given unlimited time to complete this phase.

2.1.1 Results

To determine whether *RIF* had occurred in the retrieval practice group, recall performance between the unpractised items from the practiced category (Rp- items) was compared with the recall performance of the unpractised items from the unpractised category (Nrp items). To establish if this happened, an ANOVA was first conducted to indicate whether there was a significant difference between the three categories, i.e. Rp+ items (practiced items from a practiced category), Rp- items (unpractised items from a practiced category), and Nrp items (unpractised items from an unpractised category) for the two groups. The results indicated a significant interaction, $F(2, 60) = 23.83$, $p < 0.001$, and therefore, a single factor ANOVA was conducted for each group separately. As expected, a single factor (items: Rp+, or Rp-, or Nrp) within ANOVA indicated a main effect for the retrieval practice group, $F(1, 45) = 37.99$, $p < 0.0001$. In addition, a single factor within ANOVA conducted on the control group showed there was no significant difference between the recall means of the different items (i.e., Rp+, or Rp-, or Nrp), $F(1, 45) = 0.53$.

Figure 2.a shows the mean number of correctly recalled items for the different item types (i.e., Rp+, Rp-, and Nrp) for the retrieval practice group and the control group. The vertical bars indicate the standard error for each item type for the retrieval practice group and the control group.

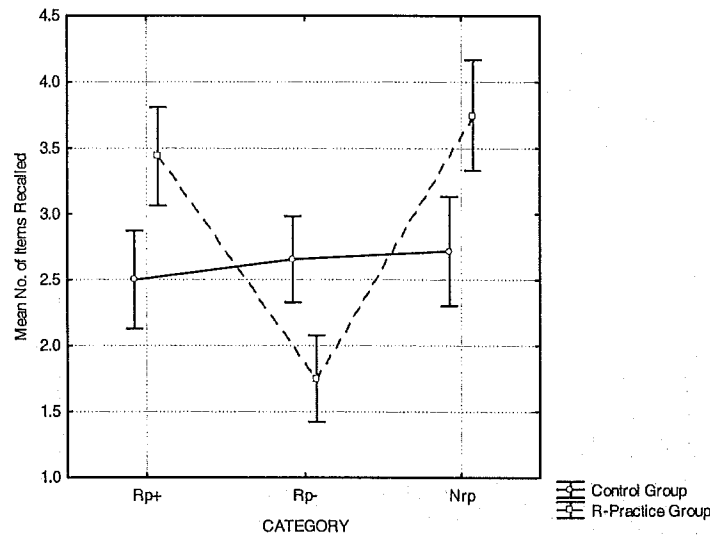


Figure 2.a Mean recall as a function of group and item type. Error bars indicate standard errors.

Newman-Keuls post-hoc comparisons for the retrieval practice group indicated that the recall of Nrp items was significantly higher than the recall of Rp- items ($M = 3.75$ vs. 1.75) suggesting that *RIF* had occurred. However, the retrieval practice group recall performance of Rp+ items was not significantly greater than the recall of Nrp items ($M = 3.44$ vs. 3.75), bringing into question the appropriateness of the retrieval practice phase of the experiment and whether the aforementioned Rp- result occurred due to *RIF*. The predicted result of Rp+ items being significantly greater than the Nrp items is generally important as it demonstrates the benefits of retrieval practice, which in turn may lead to a demonstration of the consequences of retrieval practice, i.e. *RIF* of the related items (Rp- items).

With the inclusion of a control group, it was possible to further compare the effects of retrieval practice on recall performance. A series of independent t-tests was conducted to examine the differences between the recall performance of the retrieval practice group and the baseline performance of the control group. As predicted the retrieval practice of study items increased the recall of the Rp+ items, ($M = 3.44$ vs. 2.50), $t(30) = 3.64$, $p < 0.001$. With regard to the Rp- items, the results showed that there was recall impairment of these items as an effect of retrieval practice, ($M = 1.75$ vs. 2.66), $t(30) = 3.99$, $p < 0.001$. However, again there was an unexpected finding involving the increased recall performance of the Nrp items for the experimental group in comparison to the control group, ($M = 3.75$ vs. 2.72), $t(30) = 3.57$, $p < 0.001$. Because of the typical findings in *RIF* experiments, it was predicted that there would be no significant difference between the recall of the Nrp items for the two groups, indicating that the retrieval practice of study items has no effect on Nrp items.

2.1.2 Discussion

The results from Experiment 1 have produced an interesting and potentially important finding in the context of law examination preparation. The experimental group's recall of the Rp+ items in comparison to the control baseline performance suggests that there are benefits to retrieval practice. The results also revealed that the experimental group's recall of the Rp- items was significantly impaired in comparison with the control group's baseline performance. Both of these results suggest that *RIF* has occurred. However, because there was a non-significant effect between the experimental group's recall performance of the Rp+ items and the Nrp items, it is

questionable whether the retrieval practice phase of this experiment was valid. The retrieval practice phase was designed to replicate as realistically as possible the method in which law students study case law facts. To emulate this, the participants were instructed that they would be given the opportunity to read and mentally practice a subset of five of the evidential facts and the statute provisions. This was deemed an important factor in the experimental design as in reality the preparation study for law examinations involves the reading of massive amounts of literature. It is therefore, common practice for the students to simply bullet point case law information, sometimes months in advance, and then read it once or twice before the exam. This method of study is in contrast to a more active retrieval of the information, wherein students might retrieve information several times by using cues that probe their memory for the information.

Previous research has indicated that for the benefits of retrieval practice to occur, a more active method of retrieval may be necessary in comparison to the method of repeated study exposure to the practiced items (Rp+ items). For example, in their mock examination experiment, Macrae and MacLeod (1999) cued their participants in the retrieval practice phase by presenting only partial information about a practiced item (Rp+ item). Instead of displaying the item *Bilu's only export is copper*, the participants were presented with *Bilu's only export is c_____*. This technique ensured that the participants needed to actively retrieve the study items. Ciranni and Shimamura (1999) found that mere extra study exposures to the practiced items (Rp+ items) did not lead to the impairment of the related items (Rp- items). However, although there was no apparent impairment of the related items, they did find that the exposure to study items did increase the recall performance of these practiced (Rp+)

items. Anderson and Spellman (1995) obtained a similar result with extra study exposures and found that even though there was an increase in the recall performance of the practiced items (Rp+) in comparison to the Nrp items, the presence of extra study exposures did not impair the related items (Rp-). The interesting point to note with Experiment 1 in the current study is that opposite results were obtained. There was no significant recall difference between the Rp+ items and the Nrp items. Furthermore, the experimental group's recall performance of the Rp- items was significantly impaired in comparison to: 1) the practiced items from the practiced category (Rp+ items); 2) the unpracticed items from the unpracticed category (Nrp items); and 3) the control group's recall performance of the Rp- items.

An explanation for the non-significant difference between the experimental group's recall of Rp+ and Nrp items may involve the type of recall task that the participants completed during Experiment 1. To help explain this recall task account, consider that in their second experiment, Macrae and MacLeod's (1999) experimental materials included two different categories (i.e., two different islands, Bilu and Tok) with ten attached exemplars (i.e., 10 geographical facts about each island). The ten geographical facts belonging to each island were independent in their content and had no implicit connection to each other, other than the category they ended up in (e.g. unpracticed items in a practiced category, Rp- items) and that they were facts about geographical issues. For example, 'Bilu's main export is copper' has no implicit connection to 'the official language in Tok is French' other than the connections mentioned above.

In contrast, the categories in my study may have engaged an implicit connection, which might explain the unusual finding that there was no significant difference between the experimental group's recall task of the Rp+ items and the Nrp items. More specifically, there is a basic premise in the practice of Western law that a lawyer never asks a question of a witness unless the lawyer is certain about what the answer will be (Bagshaw, 1996; Best, 2001; Heydon, 2000). This is a fundamental principle of witness cross-examination that is reiterated on a regular basis throughout the university study of law. The principle demands that law students consistently search for arguments that counter any stated witness evidence. It is therefore very common for law students to quickly develop an ability to derive counterarguments to the arguments they put forward in their defence or prosecution of the accused. It is possible that the law student's propensity to generate counterargument information may explain why no significant difference was obtained between the Rp+ items and the Nrp items.

To expand on this counterargument point, consider that the two categories in this experiment provided exemplars (i.e., evidential facts and statute provisions) that were either an *advantage* or *disadvantage* to the defendant (i.e., ten facts and provisions belonged to the *Advantage* category; the other ten belonged to the *Disadvantage* category). However, although Advantage and Disadvantage are independent categories, (similar to Bilu and Tok) there is still an implicit link connecting the materials in that, one category helps to prove the innocence of the accused (i.e., advantage), and the other category helps to prove the guilt of the accused (i.e., disadvantage). Because law students generally develop an ability to generate the information needed to counter their legal arguments, their retrieval practice of study

items in Experiment 1 could immediately bring to mind the counterarguments to these study items. In other words, when law students practice evidential facts and statute provisions that are for example, an *advantage* to the accused, this would be akin to the students also practicing the facts and provisions that are a *disadvantage* to the accused. For example, a statute provision reviewed by the participants in the present study that was an *advantage* to the accused in the criminal case is as follows: ‘a provision of the Crimes Act statute states that everyone is justified in using reasonable force in employing self-defence for his or her own protection.’ In contrast, another statute provision that was considered a *disadvantage* to the accused is as follows: ‘a principle of self-defence states that when the accused uses more force than what the law allows, the accused is liable for the excess of force used.’ It is possible, therefore, that these two statute provisions from the different categories counter each other in such a way that when the participants recalled the advantageous provision (i.e., Rp+ item) they also recalled a provision that was a disadvantage to the accused (i.e., an Nrp item). To be successful in the defence or prosecution of an accused person, a lawyer needs to have equal awareness of any *advantages* to the accused as well as having awareness about any *disadvantages* to the accused and this principle is taught from year one in law school. Therefore, to clarify the above point, when recalling the Rp+ items (e.g., items that are an *advantage* to the defendant) the retrieval practice participants in this experiment (i.e., law students), may have habitually attempted to generate items that are a *disadvantage* to the defendant (i.e., Nrp items) that would counter the innocence or guilt of the accused. Due to the passive retrieval design of this experimental task and the law student’s propensity to generate counterarguments, the finding of no significant difference between the Rp+ items and Nrp items may have a plausible explanation. It appears that a more active form of retrieval practice

may be required to produce a significant difference between the experimental group's recall of the Rp+ items and the Nrp items. However, the extra study exposures did impair the recall of the Rp- items in comparison to the baseline performance of the control group, which suggests that some form of *RIF* is affecting the related items (Rp- items).

2.2 *Experiment 2.*

According to Pichert and Anderson (1977), when individuals take a certain *perspective* before encoding meaningful information, the perspective assists the integration of the meaningful facts, which results in the easier retrieval of the information later. Macrae and Roseveare (2002) argued that any meaningful information that is *relevant* to an individual will be particularly resistant to temporary forgetting. Experiment 2 was conducted to explore whether imposing self-relevant perspectives to the encoding of the experimental materials (i.e. the evidential facts and the statute provisions) would affect the recall of the unpracticed items from the practiced category (Rp- items). The imposed perspectives included the identity of a ‘criminal defence lawyer’ representing a sibling and the identity of a ‘public defender’ representing an unknown person. It was thought that the participants would deem these particular perspectives as self-relevant as the participants were law students studying for a law degree, which in many cases leads to the practice of law. It was also expected that any effects of the perspectives on recall performance would generalise across perspectives. It was predicted that if the perspectives were powerful enough to integrate the evidential facts and the statute provisions, the effects of *RIF* would be reduced and this would be indicated by the perspective participants recalling an equal amount of Rp- items to that of the Nrp items. However, if the perspectives were not powerful enough to integrate the complexity of the evidential facts and the statute provisions, the perspective participants would show an impaired recall of the Rp- items, similar to the non-perspective participants.

2.2.1 Method

Participants

Forty-eight undergraduate students were asked to serve as participants in this experiment and received either entry into a draw for dinner vouchers and a free chocolate bar or a cash payment of \$5.00.

Procedure and Materials

This experiment employed a procedure similar to that of Experiment 1 in that it used a study phase, a retrieval practice phase, a distracter phase and a final recall phase. The participants read the same fictional criminal case and were presented with the same 20 evidential facts and statute provisions as in Experiment 1. However, in the study phase two experimental groups were instructed to take either a 'criminal defence' perspective or a 'public defender' perspective when encoding the facts and provisions. The instructions for both perspectives were in a standardised written format and are presented in Appendix C.

The non-perspective group was given no perspective and instructed to simply review the presented evidential facts and statute provisions. The same counterbalancing method for the evidential facts and provisions in the Rp+, Rp-, and the Nrp item categories was used as in Experiment 1. Following the study phase, as part of the retrieval practice phase, the non-perspective group and the perspective groups viewed

5 facts and provisions (Rp+ items) three times, providing a total of 15 retrieval practice trials. Albeit the results from Experiment 1 indicated that the design of the retrieval practice phase for the retrieval practice group was not active enough to produce a result indicating the benefits of retrieval practice, it was decided to repeat this design for the following reason. The results from Experiment 1 indicated that the retrieval practice group's recall of the Rp+ items was not significantly greater than the Nrp items, however, there was still impairment of the Rp- items in comparison to both the Rp+ items and the Nrp items. It was predicted that with the added condition of self-relevant perspectives when encoding the practiced items, the perspective participants would show a superior recall of the practiced items (Rp+ items), as there was a heightened importance to recalling these items. With the inclusion of a non-perspective retrieval practice group, a comparison between the recall performances of the Rp+ items could be made to see if there was any significant difference between the perspective groups and the non-perspective group.

Following the distracter phase (the same task as Experiment 1), all three groups of participants engaged in a final recall task and were instructed to recall as many evidential facts and statute provisions as possible. However, the perspectives groups received an additional recall instruction to that of the non-perspective group. The final recall instruction enhanced to a greater degree the dire consequences of losing the case, and therefore the importance of recalling all of the evidential facts and the statute provisions (see Appendix D for the final recall instruction).

2.2.2 Results

An ANOVA was conducted to determine whether *RIF* had occurred in the non-perspective group's recall performance of the unpracticed items from the practiced category (Rp- items). The results were also analysed to determine whether the instruction to take a self-relevant perspective when viewing the information reduces or eliminates the occurrence of *RIF* and whether any effects of the perspective taking generalised across the perspectives. The ANOVA showed a significant within main effect for Category (items: Rp+, or Rp-, and Nrp) on recall performance, $F(2, 90) = 36.88$, $p < 0.0001$. However, there was no interaction, indicating that there was no significant difference between the recall means for the two groups on the different item types (items: Rp+, Rp-, and Nrp), $F(4, 90) = 0.19$.

Figure 2.b shows the mean number of correctly recalled items for the different item types (i.e., Rp+, Rp-, and Nrp) for the two perspective groups (i.e., criminal defence and public defender) and the non-perspective group. The vertical bars indicate the standard error for each item type for the perspective groups and the non-perspective group.

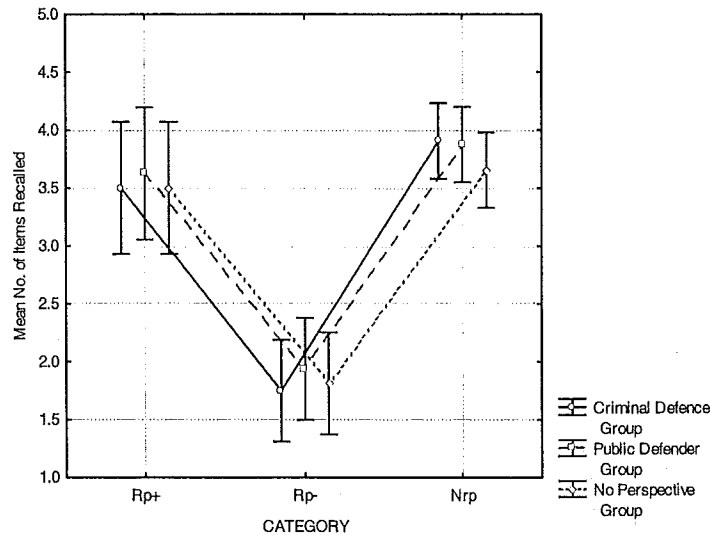


Figure 2.b Mean recall as a function of group and item type. Error bars indicate standard errors.

Newman-Keuls post-hoc comparisons revealed that the non-perspective group's recall of Nrp items was significantly higher than the recall of Rp- items ($M = 3.65$ vs. 1.81) suggesting that *RIF* had occurred. However, similar to Experiment 1, the non-perspective group's recall performance of Rp+ items was not significantly greater than the recall of Nrp items ($M = 3.44$ vs. 3.75).

The post hoc comparisons revealed that the results from the perspective groups do not support the prediction that perspective taking integrates the study items and reduces impairment of the Rp- items. The recall of the Nrp items was significantly higher than the recall of the Rp- items for both perspectives (criminal defence $M = 3.91$ vs. 1.75 ; public defender $M = 3.88$ vs. 1.94). The results also indicated that there was no significant difference between the recall of the Rp+ items and the Nrp items for both perspectives (criminal defence $M = 3.50$ vs. 3.91 ; public defender $M = 3.63$ vs. 3.88). It was predicted that the perspective groups would show a significant difference between the Rp+ items and the Nrp items as the perspectives were expected to increase the recall retrieval of the Rp+ items.

With the inclusion of a non-perspective group, it was possible to further compare the effects of retrieval practice on recall performance when taking a perspective. A series of independent t-tests was conducted to examine the differences between the recall performance of the perspective groups and the baseline performance of the non-perspective group. The results indicated that there was no significant difference between the recall means of the non-perspective group and the 'criminal defence' perspective Rp+ items, $t(30) = 0.001$. Similarly, there was no difference between the recall means of the non-perspective group and the 'public defender' perspective Rp+ items, $t(30) = 0.37$. It was expected that the participants taking a perspective would show an increase in the number of recalled study items (Rp+ items) in comparison to the baseline performance of the non-perspective group.

Independent t-tests indicated that there was no significant difference between the three groups and their recall of the Rp- items. This was true for both perspectives as the results indicated that there was no difference between the recall means of the Rp- items for participants assigned to the criminal defence lawyer defending a sibling perspective and the more generalised perspective of public defender, $t(30) = 0.55$. There was no difference between the mean for the non-perspective group and the mean for the criminal defence group, $t(30) = 0.20$, and the result between the non-perspective group and the public defender group also showed no difference between the means, $t(30) = 0.46$. This suggests that there was a problem with the effectiveness of both of the assigned perspectives reducing the effects of *RIF* and that perhaps the participants for what ever reason, did not perceive these perspectives as self-relevant.

2.2.3 Discussion

Experiment 2 produced important results relating to both the non-perspective group and the perspective groups. The results for the non-perspective group replicated the results from Experiment 1 in that, it appears that *RIF* is occurring because of retrieval practice. However, again, there is the issue of the non-significant result between the recall of the Rp+ items and the Nrp items. As this finding also replicated Experiment 1, this result for the non-perspective group was not unexpected and lends support to the idea that law students are demonstrating their ability to generate counterarguments from the Nrp items.

Regarding the perspective groups, the results do not support the idea that perspective taking reduces the effects of retrieval practice (i.e. *RIF*). In contrast to these results, Macrae and Roseveare (2002) found that self-relevant information is resistant to *RIF*. They found that when participants take the perspective that they are the ones purchasing a number of gifts, their recall performance of the Rp- gift items is no longer impaired. In contrast, when the participants were assigned the perspective that an unknown person purchased the gifts, the impaired recall of the Rp- gift items remained. In this study, it was expected that because the participants were law students, the assigned perspectives of 'criminal defence lawyer' and 'public defender' would engage a high level of self-relevance. This was not the case and an explanation for this may be that the law students, many of which were first and second year students, were not able to successfully perceive themselves as potential lawyers. This may be because at this stage of their tertiary study, the law students lack the necessary self-efficacy to envisage themselves as practicing lawyers, as generally, the vast

majority of law students are culled in their first or second year of study and therefore they do not end up practicing law.

Another reason for this finding may be that in comparison to a list of gifts (the materials used by Macrae and Roseveare (2002) in their self-relevant perspective study) the level of complexity of the evidential facts and statute provisions was too high to receive integration through a perspective. In other words, the imposed perspectives may not have been powerful enough to integrate the complexity of the twenty sentences that made up the experimental materials (e.g., When arresting Peter for Johnny's death, the arresting officers failed to inform Peter as to his legal rights, therefore, a possibility exists that the procedural aspects of the arrest are illegal).

3.0. Experiment 3.

The unusual findings thus far in Experiments 1 and 2 that showed the impaired recall of the Rp- items, and the unexpected non-significant difference between the recall of the Rp+ and Nrp items, has produced ambiguity as to whether *RIF* had occurred. It was, therefore, decided to investigate whether modifying the retrieval practice phase of Experiments 1 and 2 to require more active processing would result in a significant difference between the recall performance of the Rp+ items and the Nrp items. Recent research has indicated that mere extra study exposures to study items has been ineffective in producing the benefits of retrieval practice (i.e., a significant recall difference between the practiced items from a practiced category, Rp+ items and the unpracticed items from an unpracticed category, Rp- items) (Ciranni & Shimamura, 1999, Anderson & Spellman, 1995). It was expected, therefore, that by designing the retrieval practice phase to be more active, the memory resources allocated to encoding the study items (Rp+ items) during the retrieval practice phase would reduce the law students' ability to generate counterarguments from the Nrp items. In other words, if the effect of having a more active form of recall during retrieval practice exhausts the availability of resources for generating counterarguments, then the non-perspective group should show a significant difference between the recall of the Rp+ items and the Nrp items.

A perspective group was included to test whether enhancing the retrieval practice phase would have any effect on the recall performance of the Rp- items. If the

perspective taking integrated the evidential facts and the statute provisions, it was expected that the participants would show an increase in recall performance for the Rp- items in comparison to the non-perspective group. However, if the perspective taking again failed to integrate the complexity of the facts and provisions for whatever reason, it was predicted that there would be similar recall between the two groups.

3.1 Method

Participants

Thirty-two undergraduate Canterbury university law students served as participants in this experiment, they were elicited on a voluntary basis, and received a cash payment of \$5.00.

Procedure and Materials

Experiment 3 was conducted with two groups of participants, a perspective group and a non-perspective group. As there was no indicated difference in Experiment 2 between the results for the perspectives, it was decided to instruct the perspective participants in this experiment to envision themselves as a 'public defender'. The identity of a public defender representing an unknown person was considered the more general of the two perspectives.

This experiment, as in experiment 1 and 2, employed a modification of the Macrae and MacLeod's (1999) task, including a study phase, a retrieval practice phase, a distracter phase and a final recall phase. However, in contrast to Experiments 1 and 2, the retrieval practice phase was modified to enhance the participant's act of retrieval

of the Rp+ items. In the retrieval practice phase, all of the participants were instructed that they would review a subset of the evidential facts and statute provisions three times. They were initially instructed for the first power-point screening to write down each of the different facts and provisions. For the second and third power-point screenings of the facts and provisions, the participants were instructed to use these additional reviewing times to modify or correct anything that they had incorrectly written down about each fact and provision.

Although the retrieval practice phase in this experiment was designed to ensure a more active form of retrieval, it still captures the way law students prepare for exams. When preparing for law examinations, law students tend to bullet point information from law reports that they consider important to the legal topic that they are studying. It was therefore considered important to replicate this technique in the retrieval practice phase of this experiment.

In addition to enhancing the active nature of the retrieval practice phase, it was decided to add an extra fact or provision to each category condition (i.e. Rp+, Rp-, and Nrp items) as this would hopefully illustrate a more significant difference between the Rp+ items and the Nrp items. The additional evidential facts and statute provisions are as presented in Appendix E.

The distracter phase and the final recall phase remained the same as Experiment 1 and Experiment 2, with the participants receiving a thank you and a debrief at the completion of the experiment.

3.2 Results

An ANOVA was conducted to determine whether *RIF* had occurred in the non-perspective group's recall performance of the unpracticed items from the practiced category (Rp- items). The results were also examined to establish whether the enhanced active nature of the retrieval practice phase produced a significant difference between the recall performance of the Rp+ items and the Nrp items for both groups. In addition, the results were analysed to investigate whether the instruction to take a perspective when reviewing the facts and provisions had any effect on recall performance in comparison the non-perspective group. The ANOVA showed a significant within main effect for Category (items: Rp+, or Rp-, and Nrp) on recall performance, $F(2, 90) = 207.35, p < 0.0001$. However, as with Experiment 2, there was no interaction, indicating that there was no significant difference between the recall means for the two groups on the different item types (items: Rp+, Rp-, and Nrp), $F(4, 90) = 1.42$.

Figure 3. shows the mean number of correctly recalled items for the different item types (i.e., Rp+, Rp-, and Nrp) for the perspective group and the non-perspective group. The vertical bars indicate the standard error for each item type for the perspective group and the non-perspective group.

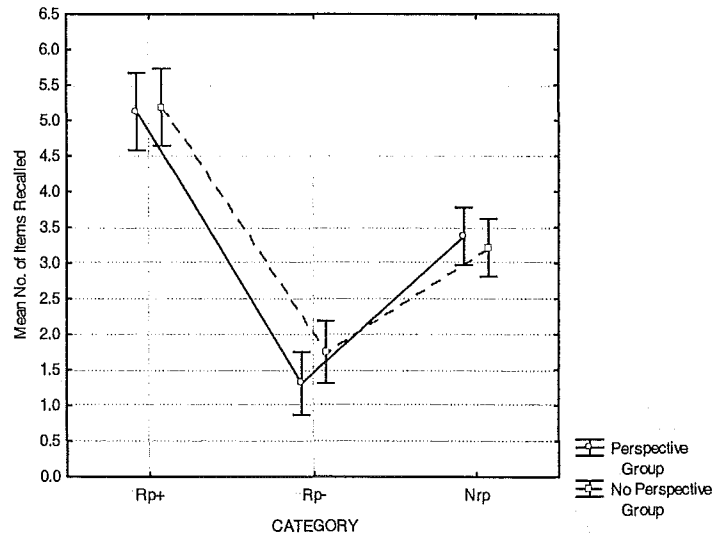


Figure 3. Mean recall as a function of group and item type. Error bars indicate standard errors.

Newman-Keuls post-hoc comparisons for the non-perspective group indicated that the recall of Nrp items was significantly higher than the recall of Rp- items ($M = 3.38$ vs. 1.75) suggesting that *RIF* had occurred. More importantly, the comparisons revealed that the recall performance of the Rp+ items was significantly higher than the recall of the Nrp items ($M = 5.19$ vs. 3.22), indicating the benefits of active retrieval practice. As stated earlier, this result is generally important because it shows the advantage of actively retrieving information and it supports the argument that the significant recall performance of the Rp+ items can ultimately lead to the inhibition of related items.

A series of independent t-tests was conducted to establish whether there were any significant differences between the recall performance of the non-perspective group and the perspective group. Comparable to Experiment 2, the results showed that the perspective participants received a similar impaired recall mean for the Rp- items to that of the non-perspective group ($M = 1.31$ vs. 1.75), $t(30) = 1.43$. Regarding the practiced items from the practiced category, the results revealed no significant difference between the non-perspective group's recall mean of the Rp+ items and the

perspective group's recall mean of the Rp+ items, ($M = 5.19$ vs. 5.13), $t(30) = 0.17$. Taken together, these results suggest that, as with Experiment 2, the participants did not perceive this perspective as self-relevant. It appears that either the law students lack the confidence to envision themselves as practicing lawyers or the perspective is not powerful enough to integrate such complex information.

3.3 Discussion

Overall, the results from Experiment 3 produce strong evidence that the retrieval practice of selected study items in preparation for exams has both positive and negative effects. On one hand, students are quite clearly advantaged if they have chosen the correct information to study and are able to answer the exam questions with clarity. However, if the questions require the retrieved knowledge from related unpracticed information, it appears that the students are placed in a disadvantaged position. The results from this experiment suggest that the retrieval practice of selected study items produces *RIF* resulting in the detrimental inhibition of related study items. This suggests that the strategy of answering selected exam questions may not be the best strategy for exam preparation. It also appears that, in the context of law students studying information from legal cases, the use of perspectives is not strong enough to integrate the complexity of meaningful sentences. This indicates that some other type of integration that is perhaps more powerful is needed before successful integration of meaningful information, such as evidential facts and statute provisions can take place.

4.0 General Discussion

The present study focused on three objectives relating to the possible existence of an inhibitory mechanism in selective memory retrieval: 1) to establish whether the phenomenon of *retrieval-induced forgetting* exists in the context of tertiary law examination preparation; 2) to determine whether assigning self-relevant perspectives to legal information has any effect on the occurrence of *retrieval-induced forgetting*; 3) to ascertain whether making the retrieval practice task more active enhances recall of practiced items from a practice category (Rp + items), compared to the recall of unpracticed items in the unpracticed category (Nrp items). The motivation for the exploration of *retrieval-induced forgetting* (RIF) in the context of tertiary law examination preparation began with findings from Anderson and Spellman (1995) using lists of word pairs, and Macrae and MacLeod (1999) in the context of a mock Geography exam. These studies found that the act of remembering certain information could prompt the forgetting of related items in memory. Anderson (2003) argued that the forgetting of related items is the result of an inhibitory mechanism engaged to deal with the potential competitors to target items in memory.

The Experiments in the current study produced some interesting findings. The replication of *RIF* in a new context, (i.e., the study of tertiary law) was successfully achieved and adds to the increasing number of social situations in which the phenomenon occurs. It appears that the retrieval practice of a subset of evidential facts and statute provisions connected to a criminal case can lead to the impaired recall of

related facts and provisions. This finding supports previous research that suggests that an exam study technique requiring the repeated answering of selected questions may actually be detrimental to exam performance.

An unusual finding in this study that has produced new insights into the context of tertiary law examination preparation showed that the retrieval practice of study items (Rp+ items) for some reason had an enhancing recall effect on the Nrp items (unpracticed items from an unpracticed category). Generally, other inhibition studies show that the retrieval practice of study items has no effect on Nrp items. Contrary to other social applications of *RIF* (e.g., impression formations), the study of law seems to produce the propensity to recall counterargument information from the unpracticed category (i.e., Nrp items). In other words, it appears that in the present study, the participants' retrieval practice of the study items (e.g., evidential facts and statute provisions that are an *advantage* to the accused) helps to retrieve the counterarguments to these study items (e.g., evidential facts and statute provisions that are a *disadvantage* to the accused).

4.1 Implications for Inhibition in the Context of Law Study

Preparation for tertiary law examinations demands the laborious task of identifying the important points from massive amounts of legal information. The 'question spot' approach (i.e., best-guess heuristic as to possible exam questions) that allows law students to reduce the amount of encoded information appears to have both positive and negatives consequences. The retrieval practice of selected facts leads to an increased ability to recall this information. However, the downside of this is the

resulting impaired recall performance of non-selected, but potentially important information relevant to exam questions. An implication from the current study, therefore, suggests that if law students study only selected legal facts, their ability to retrieve related legal facts is weakened by a recruited inhibitory mechanism. Furthermore, it appears that the inhibition of related facts may occur from the more passive study technique of reviewing extra study exposures to the study items. This finding contrasts with previous research that suggests that extra study exposures will not result in the impaired recall of related information.

Another potentially valuable implication from the current study is that the type of recall task and sample population used may have some bearing on recall performance. It appears that the retrieval practice of study items (Rp+ items) by law students can assist the retrieval of unpracticed information (Nrp items) when the recall task involves the retrieval of legal evidence in a criminal case. In contrast to disciplines that emphasise a one-directional prediction relating to the cause and effect of an event, the study and practice of law requires the ability to argue both sides of an issue. My study suggests that the type of analytical thinking that law students consistently engage in can lead them to retrieve unpracticed information contained in the Nrp items when these items consist of the counterarguments to practiced (Rp+) items. It is suggested that future research examines the way in which law students encode and retrieve information. This type of research may provide insight into methods that allow for: a) a better understanding of the content being taught in tertiary institutions and b) students to question the lecture content with a superior analytical style.

With the current finding that assigning self-relevant perspectives to participants did not aid in the integration of the evidential facts and statute provisions, there was no support for Pichert and Anderson's (1977) schema theory involving perspective taking. Instead, the present findings show how resilient *RIF* can be in certain situations. This is in contrast to findings by Anderson and Bell (2001) who produced evidence showing the successful integration of learned complex propositions (e.g., the actor is looking at the tulip) using an alternative integration procedure to assigning a perspective. It is suggested that attempts be made to broaden these findings in the context of other varieties of specialised university study as it may provide valuable insight into appropriate study techniques that may differ across disciplines.

4.2 Inhibition in Selective Memory Retrieval

A review of existing research in *RIF* suggests that occasionally it is necessary for us to forget certain facts in order to remember other facts. Because a representation in long-term memory may lead to numerous associated memories, it seems reasonable that there is some type of inhibitory mechanism that is recruited to deal with the unwanted memories.

According to researchers, such as Anderson and Spellman (1995) and Macrae and MacLeod (1999), an inhibitory mechanism is recruited to overcome the interference that competing items to a target item can produce. In light of the findings from experiments reported within the current study, it appears that the same inhibitory mechanism that is responsible for making our life easier when it comes to ignoring

irrelevant information is responsible for the detrimental inhibition of information that may be needed at a later time.

The current study clearly shows that the effects of retrieval practice (i.e., *retrieval-induced forgetting*) generalise to the social domain of tertiary law study. The domain of tertiary law, thus, becomes a new addition to the other social domains where the existence of *retrieval-induced forgetting* has been established (e.g., eyewitness testimony, misinformation effects, impression formations, and mock geography examinations). This extensive body of converging evidence implies that a common inhibitory mechanism is responsible for the sometimes detrimental forgetting of competitive related items. It seems counterintuitive that an evolved memory mechanism developed to help us remember events and information, can also produce the problematic process of forgetting. However, without the ability to inhibit or forget information, we would surely be overloaded with irrelevant memories to such an extent that the act of remembering would produce target retrieval chaos.

References

- Anderson, J. R. (1983). *The architecture of cognition*. Cambridge, M.A: Harvard University Press.
- Anderson, J. R. (2000). *Cognitive psychology and its implications, 5th Ed.* Worth Publishers: New York.
- Anderson, M. C. (2003). Rethinking interference theory: Executive control and the mechanisms of forgetting. *Journal of Memory and Language, 49*, 415-445.
- Anderson, M. C. & Bell, T. (2001). Forgetting our facts: The role of inhibitory processes in the loss of propositional knowledge. *Journal of Experimental Psychology: General, 130*, 544-570.
- Anderson, M. C., Bjork, R. A. & Bjork, E. L. (1994). Remembering can cause forgetting: Retrieval dynamics in long-term memory. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 20*, 1063-1087.
- Anderson, M. C. & Green, C. (2001). Suppressing unwanted memories by executive control. *Nature, 410*, 366-368.

- Anderson, M. C. & McCulloch, K. C. (1999). Integration as a general boundary condition on RIF. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 25, 608-629.
- Anderson, M. C. & Spellman, B. A. (1995). On the status of inhibitory mechanisms in cognition: Memory retrieval as a model case. *Psychological Review*, 102, 68-100.
- Andrew, L. (1999). *Crimes Act 1961, 5th Ed.* Wellington: Butterworths.
- Atkinson, R. L., Atkinson, R. C., Smith, E. E., Bem, D. J., & Nolen-Hoeksema. (1996). *Hilgard's introduction to psychology*. New York: Harcourt Brace College Publishers
- Bagshaw, R. (1996). *Cross & Wilkins outline of the law of evidence, 7th Ed.* London: Butterworths.
- Best, A. (2001). *Cumulative Supplement Wigmore on Evidence*. New York: Aspen Publishers.
- Caldwell, R. A. (1981). *Garrow and Caldwell's Criminal Law in New Zealand, 6th Ed.* Butterworths: Wellington.
- Ciranni, M. A. & Shimamura, A. P. (1999). RIF in episodic memory. *Journal of Experimental Psychology: Learning, Memory and Cognition*, 25, 1403-1414.

Conway, M. A. (2001). Repression revisited. *Nature*, 410, 319.

Dunn E.W., & Spellman, B. A. (2003). Forgetting by remembering: Stereotype inhibition through rehearsal of alternative aspects of identity. *Journal of Experimental Social Psychology*, 39, 420-433.

Heydon, J. D. (2000). *Cross on evidence*. Sydney: Butterworths.

Johnson, S. K. & Anderson, M. C. (2003). Inhibition and semantic memory: The role of inhibitory control in forgetting semantic knowledge (In press), University of Oregon.

Levy, B. J. & Anderson, M. C. (2002). Inhibitory processes and the control of memory retrieval. *Trends in Cognitive Sciences*, 6, 299-305.

Loftus, E. F. (1979). *Eyewitness testimony*. Cambridge, M.A: Harvard University Press.

Loftus, E. F., & Hoffman, H. (1989). Misinformation and memory: The creation of new memories. *Journal of Experimental Psychology: General*, 118, 100-104.

Loftus, E. F., Miller, D. G., & Burns, H. J. (1978). Semantic integration of verbal information into a visual memory. *Journal of Experimental Psychology: Human Learning and Memory*, 4, 19-31.

- MacLeod, M. D. (2002). RIF in eyewitness memory: Forgetting as a consequence of remembering. *Applied Cognitive Psychology, 16*, 135-149.
- Macrae, C. N., & MacLeod, M. D. (1999). On recollections lost: When practice makes imperfect. *Journal of Personality and Social Psychology, 77*, 463-473.
- Macrae, C. N., & MacLeod, M. D. (2001). Gone but not forgotten: The transient nature of RIF. *Psychological Science, 12*, 148-152.
- Macrae, C. N. & Roseveare, T. A. (2002). I was always on my mind: The self and temporary forgetting. *Psychonomic Bulletin & Review, 9*, 611-614.
- Muller, G. E., & Pilzecker, A. (1900). Experimentelle Beitrage zur Lehre com Gedachtnis. *ZeitschRIFt for Psychologie, I*, 1-300.
- Neill, W., T. (1997). Episodic retrieval in negative priming and repetition priming. *Journal of Experimental Psychology: Learning, Memory and Cognition, 23*, 1291-1305.
- Pichert, J. W. & Anderson, R.C. (1977). Taking different perspectives on a story. *Journal of Educational Psychology, 69*, 309-315.

Saunders, J. & MacLeod, M. D. (2002). New evidence on the Suggestability of memory: The role of RIF in misinformation effects. *Journal of Experimental Psychology: Applied*, 8, 127-142.

Shaw III, J., S., Bjork, R., A., & Handal, A. (1995). RIF in an eyewitness-memory paradigm. *Psychonomic Bulletin & Review*, 2, 249-253.

Stephens, T. (1998). *Butterworths student companion Criminal Law, 2nd Ed.*
Butterworths: Wellington.

Appendix A

Please read the following case situation, you will then be presented with several evidential facts and statute provisions relevant to the case.

This case took place in a small town in the Otago region, New Zealand.

R v Zellman

Peter and his wife Kathleen decide to visit the local bar and grill for dinner, with the intention of going to the theatre after dinner. On completing dinner, Peter walks to the cashier desk to pay the bill while his wife Kathleen goes to the ladies-room to freshen up. Kathleen needs to go through the bar area to get to the ladies-room and in doing so encounters only one person, Johnny, an unemployed local who has been drinking heavily at the bar for some time. Johnny insists on Kathleen in joining him for a dance on the dance floor, Kathleen promptly refuses his invitation. Johnny becomes increasingly insistent and physically rough in an attempt to force her to dance. At this point, the barperson intercedes and warns Johnny to leave Kathleen alone or he will have to leave the premises. Kathleen continues on her way to the ladies-room and the barperson leaves the bar area to change a keg out the back. When returning through the bar area, Kathleen encounters Johnny for a second time and again Johnny becomes physically insistent that Kathleen join him for a dance. At this moment, Peter (Kathleen's husband) enters the bar area and witnesses Johnny's treatment of Kathleen. Peter immediately demands that Johnny move away from Kathleen and Johnny's response to this request is to ignore Peter. Again, Peter demands that Johnny leave Kathleen alone and consequently Johnny picks up a pool cue from the pool table, swings the object at Peter's head and misses. Johnny then turns his attention to Kathleen and physically threatens to hit her with the pool cue. In an attempt to stop Johnny's attack, Peter pushes Johnny with *considerable* force and Johnny falls to the ground, however, not before he smacks his head against the edge of the bar. On inspection, Johnny appears to be unconscious, however, is pronounced dead by paramedics who arrive at the scene thirty minutes later. Apart from Kathleen, there were no other witnesses to the altercation between Peter and Johnny.

Depending on the established facts – Either Self Defence *or* Culpable Homicide.

Culpable Homicide is either:

- 1) Manslaughter *or*
- 2) Murder – if the act of homicide is proven to be with appropriate mens rea (malice forethought) and not under provocation.

SENTENCING:

- 1) “Self Defence” carries no term of imprisonment.
- 2) “Murder” carries a term of life imprisonment.
- 3) “Manslaughter” usually carries a term of significantly less time served than murder.

*Appendix B***- Evidential Facts & Relevant Statute Provisions -
Either an Advantage or a Disadvantage to the Defendant****Advantage:**

- 1) A provision of the Crimes Act statute states that everyone is justified in using reasonable force in employing self-defence for his or her own protection.
- 2) The alcohol level found in Johnny's blood system was 3 times above the legal limit for driving.
- 3) A section of the Crimes Act states that culpable homicide may be 'manslaughter' if the person who caused the death did so under provocation.
- 4) When arresting Peter for Johnny's death, the arresting officers failed to inform Peter as to his legal rights, therefore, a possibility exists that the procedural aspects of the arrest are illegal.
- 5) Self-defence is legally justifiable when a defendant uses force for the protection of another person, such as a husband or wife.
- 6) Johnny has been a middleweight boxer for several years and consequently had received numerous blows to the skull, causing significant damage to the head area.
- 7) During a police interview, Johnny's girlfriend stated that recently, Johnny had blamed Peter (even though Johnny was responsible) for a failed business venture that he and Peter had collaborated in and that Johnny swore he would get revenge on Peter.
- 8) Johnny's autopsy results were inconclusive and it could not be established that the cause of death was related to the blow to his head that he had received when Peter pushed him.
- 9) Prior to the paramedics' arrival, Peter, believing that Johnny was in an unconscious state, placed Johnny in the recovery position to ensure that he had clear airways and was not in any danger of suffocating.
- 10) During a police interview, the barperson supported Peter's testimony concerning Johnny's prior physically abusive treatment of Kathleen in the bar area.

Disadvantage:

- 11) Peter has a history of serious anger issues, which sometimes resulted in violent outbursts and has attended anger management programs.
- 12) Johnny and Peter were previously business partners in a business that is currently bankrupt, due to irresponsible management decisions made by Johnny.
- 13) Kathleen has a previous history of committing adultery with other men.
- 14) A provision of the Crimes Act states that 'murder' has occurred if the offender means to cause the death of the person killed.
- 15) With the death of either Peter or Johnny several outstanding debts from their previous business becomes null and void.

- 16) Several witnesses in a local hotel claim they viewed an altercation the previous weekend between Johnny and Peter in which Peter threatened Johnny's life.
- 17) A principle of self-defence states that when the accused uses more force than what the law allows, the accused is liable for the excess of force used.
- 18) A principle of self-defence states that if the accused's use of force is proven as revenge or retaliation, then the Court may reject self-defence as a defence.
- 19) A provision of the Crimes Act states that culpable homicide is 'murder' if the offender means to cause any bodily injury (e.g., a blow to the head) that is known to the offender to be likely to cause death.
- 20) The forensic evidence relating to Johnny's fingerprints on the pool cue was contaminated and therefore, inadmissible in Court.

Appendix C

Perspective 1

“As part of the following experiment, you will be asked to read a Criminal case situation and then shown relevant Evidential facts and Statute provisions linked to the case.

NB: It is important that you read the next instruction CAREFULLY!!!!

When you read the following case and view the evidential facts and statute provisions

Please imagine yourself as the ‘Criminal Defence Lawyer’ that will be defending the accused in this case in the High Court. The prosecution has charged the accused with ‘Culpable Homicide’.

The accused is your Brother and the consequences of losing this case could be DIRE.”

Perspective 2

“As part of the following experiment, you will be asked to read a Criminal case situation and then shown relevant Evidential facts and Statute provisions linked to the case.

NB: It is important that you read the next instruction CAREFULLY!!!!

When you read the following case and view the evidential facts and statute provisions

Please imagine yourself as the ‘Public Defender’ that will be defending the accused in this case in the High Court.

The prosecution has charged the accused with ‘Culpable Homicide’ and the consequences of losing this case could be dire.”

Appendix D

Final Recall Instruction for Perspective Participants

“N.B. IMPORTANT - Remember that the consequences of losing Peter’s case are DIRE!

Hence, it is very important that you attempt to recall as many of the ADVANTAGE as well as the DISADVANTAGE Evidential Facts and the Statute Provisions as possible. As this information, in a real-life situation would help determine the outcome of Peter’s case.”

Appendix E

Additional Evidential Facts & Statute Provisions

Advantage:

- 11) A general principle of NZ criminal law provides that the burden of proof rests with the prosecution to prove beyond all reasonable doubt any crime committed, and this may prove difficult with no third party witnesses to the incident between Johnny & Peter.
- 12) NZ case law suggests that a jury may take into account that a reasonable person may overreact in a crisis situation and use 'excess force' (a situation that normally negates Self-Defence) when defending themselves or others.

Disadvantage:

- 11) The barperson is actually Peter's cousin and this family association may weaken the validity of the barperson's testimony to the police that Johnny was physically abusive towards Kathleen.
- 12) Threats of violence from Peter, in the form of abusive e-mails, were found by the police on Johnny's computer.