# The Role of Informativeness in Eyewitness Memory Reporting

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A thesis submitted to Flinders University, South Australia, in fulfilment of the requirement for the degree of Doctor of Philosophy

April 2014

Contents

**Summary**

Koriat and Goldsmith (1996) proposed that, when determining whether information from memory will be reported, people go through a process of memorial monitoring and control. Monitoring involves ascertaining the likely accuracy of a piece of information by gauging confidence in the information, and control reflects the decision to report or withhold this information. However, research indicates that people do not always adhere to the monitoring and control model when deciding what information they will report. Coarse-grain (broad, general) information is at times withheld from eyewitness memory reports despite being available in memory, likely correct and potentially quite valuable (Ackerman & Goldsmith, 2008; Brewer, Hope, Gabbert, & Nagesh, 2014; Yaniv & Foster, 1995).

The memory reporting literature suggests that coarse-grain information may be withheld from eyewitness testimony because people are motivated to be informative. Informativeness is defined in the literature as the amount of detail conveyed (Goldsmith, Koriat, & Panksy, 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995). That is, an answer is considered informative if it is specific, capturing fine detail. Fine-grain information is more specific and thus more informative than coarse-grain information (Yaniv & Foster, 1995). Accordingly, people may withhold coarse-grain information because they have a preference for reporting fine-grain information and being specific.

This thesis examined the role of informativeness in the withholding of coarse-grain information. Study 1 investigated social motivation for informativeness, exploring whether socially motivating conditions could overcome the preference for reporting fine-grain information. The results indicated that preference for specificity was resistant to social context. Study 2 ascertained whether this preference for specificity would remain, even under circumstances where coarse-grain information was potentially more

valuable than fine-grain information. Preference for specificity again prevailed, demonstrating the pervasiveness of this bias. As Studies 1 and 2 were unable to increase reporting of coarse-grain information, I investigated participants' perceptions of informativeness in Study 3, in anticipation that this would provide an insight into why coarse-grain information is at times withheld. Results indicated that, when forming perceptions of informativeness, in addition to gauging the specificity of the information, participants also judged its value and the potential effect that volunteering this information would have on their image. Further, Study 4 results demonstrated that these perceptions of informativeness significantly predicted memory reporting. Finally, in Studies 5a-c, I attempted to manipulate, albeit unsuccessfully, perceptions of informativeness, to determine whether the nature of eyewitness memory reporting could be changed. Across all studies, confidence significantly predicted the accuracy of retrieved information, suggesting that coarse-grain information was not withheld through ineffective monitoring ability and that perhaps deficient control and poor decision making was responsible for this behaviour.

Taken together, these results provide clear evidence that eyewitnesses withhold coarse-grain information from their memory reports because they are motivated to be informative and they do not want to volunteer information that they perceive to be uninformative. Further, perceptions of informativeness seem to affect reporting by influencing the process of control, prompting poor decision making.

This thesis demonstrates why and how eyewitnesses sometimes withhold coarse-grain information from their memory reports and provides insight into fine-grain preference, perceptions of informativeness and coarse-grain withholding. Further, the findings from this thesis suggest that the conceptualisation of informativeness in the literature requires revision and that perhaps the monitoring and control model could be expanded to include the effect of informativeness.

## Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made in text.

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Nicole Reid

**Acknowledgements**

First, to Neil Brewer, thank you for encouraging me to do a PhD and for teaching me so much along the way. Thank you for your time, generosity, guidance, support, valuable advice and for allowing me to be a part of the eyewitness lab. To Nathan Weber, thank you for being the statistical guru that you are and for your contribution towards this project and my learning.

Thank you to all of my research participants, confederate and reliability inter-raters, without whom, this research would not have been possible.

To my friends – Rach, Mel, Caitlin, Sam, Tomoko, Lydia, Anne, Mike and Tom, thank you for the many laughs, inappropriate conversations, lunches, morning chats, birthday parties, cheeky ciders, cones of chips, Monday night movies, Schnitmas and for all of the silliness we have had over the last four years. You made this process fun and I am so glad we got to experience it together.

To my family – Mum, Dad and Mat, thank you for your constant love, support and belief in me.

Lastly, to James, thank you for encouraging and supporting me throughout this process. Thank you for listening to my countless presentation practices, for letting me talk about eyewitness memory for the last 6 years and for taking care of everything else in our lives towards the end when I was in my thesis bubble. Thank you for being you and for marrying me during this process!

# CHAPTER 1

## Introduction

Laboratory research (e.g., Ackerman & Goldsmith, 2008; Brewer et al., 2014; Yaniv & Foster, 1995) suggests that eyewitnesses have a tendency to withhold coarse-grain (broad, general) information (e.g., the getaway car was light coloured as opposed to white, with the latter being what is referred to as fine-grain) from their memory reports. Eyewitness evidence, and coarse-grain information within this evidence, can play a crucial role in the criminal justice system during both the investigative process and court proceedings (Lowenstein, Blank, & Sauer, 2010). Coarse-grain information (such as the offender had dark hair and drove a light coloured car) can be used during fact finding to guide investigations and narrow suspect searches (to just people with dark hair and light cars). It can corroborate other accounts or indicate to the police or the courts that a suspect may be innocent (if the suspect had light hair or a dark car). My research examined why valuable coarse-grain information is sometimes withheld from eyewitness memory reports.

It is important that research ascertains why eyewitnesses withhold coarse-grain information. Once research has established why eyewitnesses behave this way, methods for extracting information, which directly target this underlying reason for withholding, can be designed and tested. Developing better interviewing techniques will ensure that police departments and prosecutors have access to as much information as possible when investigating crimes and trying suspects.

### Monitoring and Control

Eyewitness memory reports vary in their level of detail or grain size (Yaniv & Foster, 1995). A fine-grain response is specific and detailed, such as the car was white (Weber & Brewer, 2008); coarse-grain answers are broader and less precise, such as the car was light coloured (Weber & Brewer, 2008). When deciding what information will

be reported or what grain size an answer will take, Koriat and Goldsmith (1996) and, later, Goldsmith et al. (2005) proposed that people go through a process of memorial monitoring and control. Monitoring involves the ability to accurately estimate the probability that a response is correct and control reflects the decision to report or withhold a response. Koriat and Goldsmith proposed that if a "don't know" option is available people will first decide whether they are going to report the information. Second, if the information is to be volunteered, the grain size with which it will be reported must also be determined (Goldsmith et al., 2005). The individual will make this decision by setting a response criterion which is shaped by situational demands and incentives. The best candidate fine-grain answer will be retrieved from memory and its accuracy probability assessed (Goldsmith et al., 2005). Accuracy probability assessment is based on confidence in the answer. If the accuracy probability – or confidence – is equal to or greater than the response criterion, the answer will be volunteered. If not, a coarse-grain alternative will be retrieved and provided (Goldsmith et al., 2005).

**Previous Research**

The monitoring and control model outlines the processes that should underpin the reporting of information. The monitoring and control model has been applied, tested and supported in previous research. Goldsmith, Koriat and Weinberg-Eliezer (2002) found that people attempted to balance being accurate and informative and only provided fine-grain answers when they believed them to be sufficiently likely to be correct. Goldsmith, Koriat and Pansky (2005) extended upon this, testing regulation of grain size after a delay. They found that participants who were given control over grain size demonstrated a smaller decrease in accuracy after delay, compared to those who did not have control over grain size. This suggests that when given the opportunity, people provide coarse-grain information in an attempt to maintain accuracy.

Despite this, empirical evidence suggests that the grain size of a memory report does not always align with what the monitoring and control theory suggests. A memory report is not an exact duplicate of the original perception. Recall is a reconstructive process that involves selective decision making and is contingent upon communication (Brigham & Bothwell, 1983). Consequently, an eyewitness' memory for events and their subsequent report of that recall often differ (Vandierendonck & Van Damme, 1988). People may remember aspects of the events but may withhold this information from their memory reports. Below I outline three separate lines of evidence illustrating that coarse-grain information is sometimes withheld from memory reports.

The first line of evidence that runs contrary to the model of monitoring and control is provided by a study conducted by Ackerman and Goldsmith (2008) which assessed general knowledge using moderate knowledge (answerable) and low knowledge (difficult, unanswerable) items across a series of experiments. Participants were provided with a "don't know" option in one of the experiments. Participants were allowed to answer each question by providing a precise number or a bounded range of values of whatever width they saw fit. Participants were instructed that their choice of answer should reflect a response that would be helpful to a friend who had asked the question, while taking into account the limitations of their knowledge. The model of monitoring and control suggests that a coarse-grain answer will be volunteered if the fine-grain alternative does not meet the pre-set accuracy probability threshold (Goldsmith et al., 2005). Volunteering coarse-grain information can maintain accuracy when given control over grain size (Ackerman & Goldsmith, 2008). That is, through controlling grain size, people can increase the coarseness of their answers when necessary to preserve accuracy.

This proposition was not supported by some of Ackerman and Goldsmith's (2008) results. Due to the difficulty of the questions, low-knowledge answers are less likely to

be correct than moderate-knowledge answers. However, comparative accuracy between the two question types could have been obtained by answering low knowledge items with coarser-grain responses. Despite this, participants answered low-knowledge items with finer-grain responses and low confidence ratings, reducing accuracy for these questions. As a result, low knowledge items were less accurate and held with less confidence than moderate knowledge items. This finding highlights the tendency to withhold coarse-grain information and demonstrates that, contrary to the model of monitoring and control, people would rather volunteer specific information that they are unconfident in rather than broader information which is much more likely to be correct. Ackerman and Goldsmith noted that coarse-grain information may have been withheld because it was uninformative and volunteering this information may have violated social-pragmatic norms of communication. That is, providing general coarse-grain information may violate the social norm of being reasonably specific when communicating with others.

A second line of evidence comes from Yaniv and Foster's (1995) study of precision of judgements. They provided participants with a series of statements, each of which was presented with two estimates of differing grain size. Participants were told the correct answer and were asked to select which of the two estimates better answered the statement. For example, one statement addressed education funding spent by the US federal government in 1987. Participants were given the following estimates: A) $20 to $40 billion (coarse-grain) or B) $18 to $20 billion (fine-grain) and were told that the correct answer was $22.5 billion. When asked which estimate was better, 80% of participants preferred option B (the inaccurate fine-grain choice) over option A (the accurate coarse-grain choice). Yaniv and Foster noted that participants were willing to accept some error to obtain more informative judgements, suggesting that people would

rather volunteer fine-grain information and withhold coarse-grain information, even when the fine-grain information is incorrect and the coarse-grain correct.

Finally, Brewer et al. (2014) compared four different interview formats: grain size interview, self-administered interview, free recall and free recall with confidence. Participants viewed a mock crime video before providing information about the video content using one of the four interview formats. Participants' responses in the four formats were compared. In the grain size questionnaire participants were required to respond to each question with a fine-grain answer (a very specific detail such as "sky blue") and a coarse-grain answer (a broader detail such as "light"). Participants were also required to provide two confidence ratings for every question. Participants recorded their confidence using a percentage rating scale ranging from 0% to 100% anchored by "very very unsure" and "very very sure". Upon answering all of the questions, participants went back through the questionnaire and selected one of their two answers (either the fine-grain answer *or* the coarse-grain answer) for every question. The answer participants selected was their final answer to the question, that is, their preferred response. The self-administered interview (SAI) was also used. The SAI is a procedure based on the Cognitive Interview (CI), a technique designed to increase the quantity and quality of remembered information (Fisher & Geiselman, 1992). The SAI presents the retrieval techniques of the CI in a self-report format. The comprehensive information and instructions provided to eyewitnesses during the SAI allows multiple eyewitnesses to be interviewed simultaneously by interviewers with relatively little training and using fewer resources compared to the CI (Gabbert, Hope, & Fisher, 2009). The SAI required participants to complete a booklet comprising five sections. Eyewitnesses received background information regarding the interview and directions for completing the booklet. Context reinstatement instructions were also provided. These instructions asked participants to mentally picture the physical and personal contexts at the time they

originally witnessed the event. Participants were asked to report everything they could remember and then information specific to the perpetrator's appearance, sequence of events, bystanders and anything not yet covered (Gabbert et al., 2009). Free recall questionnaire participants were instructed to report everything they could remember. Free recall plus confidence participants completed the same questionnaire as the free recall participants, but provided confidence ratings for each reported detail (Brewer et al., 2014).

As expected, given that respondents in the grain size interview condition had to provide a fine and coarse-grain answer for each question, the grain size interview produced more fine-grain and coarse-grain information than the other questionnaires, and accuracy for the fine-grain responses elicited in the grain size interview condition was lower than for the other interview formats. However, accuracy for the coarse-grain responses elicited via the grain size interview was no lower than for the other formats. This indicates that the prompts of the grain size interview did not elicit any additional accurate fine-grain information, but did encourage reporting of accurate coarse-grain information that was not reported under the other interview conditions. Importantly, much of the coarse-grain information that was withheld in the SAI, free recall and free recall with confidence formats was accurate and associated with high confidence. This suggests that accurate and valuable coarse-grain information is accessible in memory, but often withheld unless specifically asked for.

Taken together, the results of the three studies described above suggest that people can retrieve accurate and potentially valuable coarse-grain information. However, they appear reluctant to provide it in memory reports and, in fact, would rather volunteer inaccurate fine-grain details. The research reported in subsequent chapters examined why eyewitnesses withhold coarse-grain information from their memory reports, exploring this issue within the monitoring and control framework.

Research indicates that people are reasonably effective at monitoring. That is, people are able to successfully determine their likely accuracy by gauging how confident they are in the information. Kebbel, Wagstaff, and Covey (1996) and Luna and Martin-Luengo (2013) found that confidence was higher for correct than incorrect responses. Other studies have found that high levels of confidence can be particularly indicative of accuracy. Roberts and Higham (2002) observed that a subset of statements assigned high confidence was significantly more accurate than the full set of statements. In addition, Kebbell et al. established that, when participants were absolutely certain that a piece of information was correct, they were accurate 99.4% of the time. Taken together, these results suggest that monitoring is reasonably effective and, hence, seems unlikely to be the major determinant of coarse-grain withholding. Rather, people are seemingly choosing to withhold coarse-grain information from their memory reports, suggesting that poor control may contributing to the withholding of coarse-grain information. People may be confident in their coarse-grain response and may be aware that this response is likely to be correct; however, they may choose to withhold this information from their memory reports. If this is indeed correct, an additional factor, not specified in Koriat and Goldsmith's (1996) model, must be impacting control. That is, there must be a reason why people choose to withhold coarse-grain information. The motivation to be informative may be this additional factor, affecting the process of control and leading to the withholding of coarse-grain information from eyewitness accounts.

**Informativeness**

Informativeness is currently operationalised in the memory report literature as the amount of detail reported (Weber & Brewer, 2008). That is, an answer is informative if it is specific and, as the amount of detail provided rises, informativeness increases (Goldsmith et al., 2005; Yaniv & Foster, 1995). A memory report stating that the

getaway car was white would be considered informative as this description is specific and detailed. Stating that the getaway car was light coloured would be considered uninformative as this statement is not specific and not much detail is reported. A trade-off between informativeness and accuracy (the likelihood that a reported item is correct (Koriat & Goldsmith, 1996)) often ensues when reporting information (Yaniv & Foster, 1995). Ideally a memory report should maximise the amount of informative and accurate information obtained. However, providing a precise and completely accurate account is likely to be rare as accuracy and informativeness are often contradictory goals.

Of course, a response can be accurate and uninformative in the sense that it is technically correct but irrelevant to the investigation. Equally, a response can be inaccurate but still informative. While information may not strictly be correct, it may be similar to the correct answer so may still guide the investigation in the correct direction. For example, an eyewitness may report that the offender drove a white car. In reality, the offender's car may have been cream coloured. In this situation, the eyewitness is officially incorrect; however, their memory report has informatively narrowed the police departments search to owners of light coloured vehicles. This demonstrates that the disparate aims of accuracy and informativeness can both be beneficial to a police investigation.

The trade-off between accuracy and informativeness is directly related to grain size choice. Fine-grain information is more informative than coarse-grain information, while coarse-grain information is more likely to be accurate compared to fine-grain information (Yaniv & Foster, 1995). As Ackerman and Goldsmith (2008), Yaniv and Foster (1995) and Brewer et al. (2014) found, people have a tendency to over-report fine-grain information and under-report coarse-grain information. By favouring fine-grain information over coarse-grain information, people are favouring informativeness

over accuracy. Accordingly, the motivation to be informative may underlie the withholding of coarse-grain information. People's potential preference for informativeness over accuracy could affect the process of control leading them to withhold coarse-grain information. That is, people could retrieve coarse-grain information and gauge their confidence in this information to be reasonably high. Due to their high confidence, the person may determine that the retrieved coarse-grain information is likely to be accurate. However, despite their high confidence and likely accuracy, the person may choose to withhold this information from their memory report as the retrieved information is vague, broad and not very informative. In this case, the motivation to be informative has affected control and coarse-grain information has in turn been withheld.

**Motivation for informativeness.** The memory report literature has conceptualised informativeness in terms of the amount of detailed information reported (Goldsmith et al., 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995). However, from the perspective of an eyewitness reporting information, there may be other dimensions to informativeness. For example, informativeness occurs within a social context. As Ackerman and Goldsmith (2008) noted, the social situation in which someone retrieves and provides information must be considered when evaluating memory. This suggests that informativeness has a social-interactive component. Within social contexts there are social norms that govern behaviour and communication. People are often motivated to behave in socially acceptable ways to avoid violating these norms (Ackerman & Goldsmith, 2008). Consistent with this, Yaniv and Foster (1997) suggested that participants may be reluctant to provide excessively general information for fear of violating social norms of communication. Additionally, Grice (2002) argued that people observe certain principles when conversing. One of these principles, the Cooperative Principle, suggests that conversational contributions should fit what is required by the

situation, should be timed correctly and should match the purpose of the interaction (Grice, 2002). The Cooperative Principle encompasses several sub components, one of which is Quantity (Grice, 2002). Quantity refers to the amount of information provided. Grice posits that Quantity consists of two maxims. First, communication should be as informative as required by the situation and, second, communication should not be more informative that the situation requires. That is, information provided during an interaction should be appropriately specific. In sum, people are motivated to behave in socially acceptable ways and the social norms of communication suggest that conversation should be appropriately specific. This social motivation to be informative and specific may affect the process of control, leading to the withholding of coarse-grain information. That is, people may be socially motivated to report specific information, even though they know it is likely to be incorrect.

**Perceptions of informativeness.** Informativeness also has a subjective dimension. Informativeness may incorporate subjective judgements and individual perceptions that vary across situations and individuals (Ackerman & Goldsmith, 2008). What is perceived as informative by one person in one situation may differ from what is considered informative under alternative conditions by another individual. For example, in a case where a crime was witnessed by a large number of people, some of whom could recall the exact colour, make, model and license plate of the getaway car, an eyewitness may perceive their memory that the car was light coloured to be uninformative. In contrast, in a case with no other eyewitnesses and no leads, an eyewitness may perceive their memory that the offender drove a light coloured car to be an informative piece of information.

Perceptions of informativeness do not necessarily only reflect specificity. Perceptions of informativeness may also include judgements of value. Information may be perceived as informative if it is valuable, useful, beneficial or in some way helpful.

Teigen (1985b) stated that perceptions of informativeness incorporate value and noted that trivial information is often perceived to be uninformative (Teigen, 1985a). Perceptions of informativeness may also involve image. Perceived informativeness is not just about wanting to be helpful, it is also about wanting to appear helpful (Roper & Shewan, 2002). People may perceive information as informative if it in some way benefits their image. Perceived informativeness may also include judgements of interest. Teigen (1985a) found a direct relationship between how interesting a communication is and its degree of perceived informativeness. Specifically, interesting information is considered to be more informative than uninteresting information (Teigen, 1985a). Accordingly, people may perceive information to be informative if they believe this same information is of interest. Research also suggests that when people make judgements of informativeness, their perceptions are largely shaped by the interaction between familiarity and novelty (Teigen, 1985b). That is, people perceive information to be most informative when it is about a subject that is already known to the individual, however, the content is largely novel (Teigen, 1985b). Finally, perceptions of informativeness are shaped by how relevant the information is to the topic in question (Teigen, 1985b). That is, information may be perceived to be informative if it is considered relevant.

The process of control may be negatively affected by perceived informativeness. An individual may be confident that a retrieved coarse-grain detail is likely to be correct but may choose to withhold this information as they perceive the response to be uninformative. They may believe that the general information is valueless, unimportant, irrelevant and uninteresting. They may also believe that volunteering this coarse-grain information may make them appear ridiculous or in some way detrimentally affect their image.

**Summary**

In the studies reported in this thesis I investigated why eyewitnesses withhold coarse-grain information from their memory reports. Specifically, I examined the role of informativeness in the withholding of coarse-grain information. I established (1) whether the motivation to be informative and perceptions of this informativeness underlie coarse-grain withholding, and (2) whether any effect of informativeness observed occurred over and above the influence of confidence. Koriat and Goldsmith's (1996) monitoring and control model posits that confidence guides decision making when reporting information. Research supports this proposition (Goldsmith et al., 2005; Koriat & Goldsmith, 1996). While confidence is predictive of information reported, empirical evidence suggests that there are still times when coarse-grain information is withheld (Ackerman & Goldsmith, 2008; Brewer et al., 2014; Yaniv & Foster, 1995). This suggests that, in some instances, a factor other than confidence may be affecting the process of monitoring or control, leading to this withholding of coarse-grain information. Accordingly, I examined whether informativeness had an effect over and above confidence, leading to the withholding of coarse-grain information from eyewitness reports. Finally, I examined (3) what aspect of the monitoring and control model was affected when coarse-grain information was withheld.

Study 1 examined social factors (context and audience) predicted to affect the social motivation for informativeness and, in turn, grain size choice. Study 2 investigated the pervasiveness of the motivation to be informative. In Study 3, I developed a measure of perceived informativeness. I tested this measure within a correlational paradigm in Study 4 to ascertain whether perceived informativeness predicted coarse-grain withholding and grain size choice. Finally, in Studies 5a-c, I tested a series of manipulations of perceived informativeness to establish whether perceptions of informativeness caused the withholding of coarse-grain information.

# CHAPTER 2

## Study 1: Social Motivation to be Informative

Study 1 examined whether motivation to be informative affected grain size choice. As I outlined in Chapter 1, coarse-grain information is sometimes withheld from eyewitness memory reports (e.g., Ackerman & Goldsmith, 2008; Brewer et al., 2014; Yaniv & Foster, 1995). Koriat and Goldsmith's (1996) monitoring and control model suggests that confidence guides the decision to withhold or volunteer information. I predicted that, an additional factor – the motivation to be informative, which is not specified in Koriat and Goldsmith's model – would also have an effect. I predicted that this factor would affect the process of control, leading to the withholding of this coarse-grain information.

An accurate fine-grain response to a question is more informative than a coarse-grain response, although a coarse-grain response is more likely to be accurate (Yaniv & Foster, 1995). Consequently, a preference for fine-grain information (when coarse-grain information is withheld) represents a preference for informativeness over accuracy. As I have suggested above, it is this motivation to be informative that may affect control and influence coarse-grain withholding. People are strongly motivated to behave in socially appropriate ways (Ackerman & Goldsmith, 2008) and social norms of communication suggest that conversation should be appropriately specific (Grice, 2002). This suggests that people are likely motivated to be informative when responding to questions from police investigators. Social appropriateness differs depending on context and the anticipated audience. What is the social norm in one situation with one audience will differ from what is considered appropriate under alternative circumstances with a different audience (Ackerman & Goldsmith, 2008). Accordingly, I hypothesised that manipulations of context and audience may be effective ways of inducing variance in

the motivation to provide informative memory reports and, in turn, the withholding of coarse-grain information.

**Context**

As outlined in Chapter 1, Koriat and Goldsmith's (1996) monitoring and control model suggests that during the process of control, when deciding what information to report, people will assess the likely accuracy of their retrieved information and will compare this accuracy likelihood against a pre-set response criterion. This response criterion is set by the individual and is shaped by situational demands and incentives. Thus, the process of control is affected by situational demands (Koriat & Goldsmith, 1996). Situational demands essentially reflect the social context in which the information is retrieved and provided, and control refers to the process of deciding what information will be reported. Accordingly, it stands to reason that the context at the time of providing memory reports can have an effect on the memory report provided (Smith, 1979).

One type of context that has been investigated in eyewitness report studies is response privacy: that is, whether a participant shares their responses aloud with a wider group or records their responses privately and anonymously (Shaw III, Appio, Zerr, & Pontoski, 2007). Impression management research suggests that the more public a behaviour is, the more people try to manage and control the image they are conveying (Morrison & Bies, 1991). Given that people wish to be seen as informative (Ackerman & Goldsmith, 2008), the motivation to be informative should be stronger when in public rather than private.

**Audience**

The way an event is retold is dependent on who the audience is (Dudukovic, Marsh, & Tversky, 2004). Recalling for a particular audience can make people tailor their output to suit the listener (Slugoski, Lalljee, Lamb, & Ginsburg, 1993). Vandierendonck

and Van Damme (1988) presented participants with a verbal story before asking them to recall the details for one of three groups (peers, Martians or for a contest). Recognition was then assessed. Recall was free report (participants could decide whether or not to report a piece of information) and recognition was forced report (participants had to answer every question). Results indicated that while recognition did not differ significantly between groups, recall did. This signifies that participants possessed a similar amount of information available in memory, but reported the information differently depending on for whom they were recollecting. When recalling information, participants experienced a criterion shift between audience types (Vandierendonck & Van Damme, 1988). Participants adapted their recall strategy to fit the knowledge possessed by the specific audience for whom they were recalling (Vandierendonck & Van Damme, 1988). Recall performance was better when participants perceived that the audience possessed no schema knowledge (Martians) rather than some schema knowledge (peers). Reporting differently depending on the anticipated knowledge of the audience indicates that audience type changes the way people report information.

An audience of particular interest is one that contains an authority figure(s). Research has demonstrated that the presence of authority figures influences people to do things they would not normally do (e.g., Meyer & Jesilow, 1996; Milgram, 1965). In the eyewitness field, authority presence can result in both inaccurate testimony as well as more detailed accounts. Tobey and Goodman (1992) engaged child participants in a game before questioning the children about the incident. Prior to the interview, half of the participants spoke to a police officer. Compared to the control condition, exposure to authority resulted in more inaccurate statements. When investigating the effects of social context on recall, Hyman (1994) found that people gave more detailed narratives when recalling for the experimenter (the person in the position of authority within the researcher-participant dynamic) rather than another subject.

The reduced accuracy documented by Tobey and Goodman (1992) and the increase in detail reported by Hyman (1994) are consistent with eyewitnesses being motivated to be informative when in the presence of authority. Being informative involves providing specific details but may compromise accuracy, patterns of results that are consistent with the findings described above.

**Context-Audience Interaction**

I predicted that reporting in public and to authority figures would both be associated with increases in informativeness. However, when these two factors are combined, the effect of audience may be dependent on context. In particular, the effect of authority on informativeness may be observed in public but not private. When in private, people's responses are anonymous. Responses are not shared with anyone apart from the person scoring the answers and the scorer is not aware of the participant's identity. Private group participants cannot be judged for their answers. There are no ramifications or repercussions for private group participants' responses and they cannot be held accountable for their output. As a result, audience type may have little impact on informativeness within private contexts because, even though participants may believe they are recalling for an authority, they are also aware that the authority does not know who they are.

It is important in such studies to establish that the manipulations worked as intended. Checking the effectiveness of social manipulations such as the audience manipulation (see Method section for Study 1) can be difficult as merely asking participants about their thoughts regarding the manipulation can act as a cue to the deception involved. Participating in a group situation is not uncommon for research participants, so implementing an appropriate manipulation check is relatively routine. However, authority presence in the laboratory is much more unusual. Therefore, any mention of the audience manipulation during the manipulation check may have created

doubt in participants' minds regarding the authenticity of the scorer instructions. It is unlikely that participants would have doubted the context instructions to this extent.

A measure of each individual's self-presentation concerns offers a subtle way of assessing the effectiveness of the manipulation. Self-presentation is used to create and manage a desired impression for others (Jones & Pittman, 1982). Concern with image is common to most people and encompasses many interpersonal interactions (Jones & Pittman, 1982). People are greatly concerned with the image they convey and this concern varies between audience types. People seek approval from authority and desire to create a good impression when in authority presence (Lowenstein et al., 2010). Consequently, concern with one's image should be greater in high authority presence compared to low authority presence.

**Response Bias**

In Study 1, I investigated whether coarse-grain information was withheld and ascertained whether context and audience predicted this withholding by altering the social motivation to be informative. I also established whether any withholding of coarse-grain information observed was beneficial or detrimental to the individual and their memory report. Withholding coarse-grain information and volunteering fine-grain information is beneficial if the fine-grain information reported is correct because correct fine-grain information is both accurate and informative. However, withholding coarse-grain information and volunteering fine-grain information can be detrimental if the fine-grain information is incorrect and the coarse-grain correct, as no knowledge is contributed even though accurate information was available in memory.

Beneficial and detrimental coarse-grain information withholding can be distinguished using Type-2 signal detection theory (SDT). SDT is traditionally used when two stimulus types must be discriminated (Stanislaw & Todorov, 1999). Typical application of SDT involves discriminating between stimuli presented and no stimuli

presented (Stanislaw & Todorov, 1999). A variation of SDT (Type-2 SDT) extends this to include discrimination between decision types (Higham, 2007): for example, the decision to volunteer fine-grain information or coarse-grain information. Type-2 SDT categorises responses into one of four categories: hit, false alarm, miss and correct rejection (see Results section of Study 1 for a full definition of the four response options in relation to this research). Based on these four different types of responses, discriminability (*d'*) and response bias (*c*) indices were calculated. Discriminability refers to a person's accuracy or their ability to distinguish a correct answer from an incorrect answer. A higher discriminability index is indicative of a greater ability to distinguish correct from incorrect responses (Stanislaw & Todorov, 1999). Response bias refers to a person's tendency to respond in a particular way (Stanislaw & Todorov, 1999). In this study, response bias refers to the tendency to report fine-grain information and the motivation to be informative. A lower response bias index is indicative of a greater tendency to respond in a particular way (greater tendency to report fine-grain information) (Stanislaw & Todorov, 1999). Through SDT, I established whether coarse-grain information was withheld because the fine-grain information available was accurate (beneficial coarse-grain withholding) or because participants had a tendency to report fine-grain information regardless of its accuracy (detrimental coarse-grain withholding).

To summarise, Study 1 examined why coarse-grain information was withheld from eyewitness memory reports. In particular, I investigated the effects of context and audience on grain size choice and response bias. Confidence was measured to determine whether context and audience affected grain size choice over and above the influence of confidence, and to ascertain which aspect of the monitoring and control model was affected when coarse-grain information was withheld. Self-presentation was also measured as a manipulation check for audience.

Context was manipulated through response privacy: Participants were informed that they would either read their responses aloud to the scorer and other participants in the session or their responses would remain private and anonymous. Audience was manipulated through authority presence: Participants were informed that either a police officer (high authority presence) or a research assistant (low authority presence) would score their responses. To maintain consistency with previous manipulations of authority (Lowenstein et al., 2010; Tobey & Goodman, 1992) and to closely resemble real life practices where an eyewitness would give a memory report to a police officer, the police were chosen to represent authority.

Grain size choice was measured using the protocol outlined in Brewer et al.'s (2014) study. After providing a fine-grain answer and a coarse-grain answer for every question, participants were required to select one of these answers as their final answer or preferred response to the question. In particular, I examined proportions of preferred responses that were fine-grain to determine if coarse-grain information was withheld. Response bias and discriminability indices were used to examine why coarse-grain information was withheld. Fine-grain proportion is the inverse of coarse-grain proportion, meaning that coarse-grain withholding can be assessed using fine-grain proportion. Fine-grain proportion is necessary for some of the analyses and is consistent with the model of monitoring and control which focuses upon fine-grain confidence and fine-grain choice (Goldsmith et al., 2005; Koriat & Goldsmith, 1996). As a result, I used fine-grain proportion in analyses and results. However, findings are discussed in terms of coarse-grain withholding.

I predicted that context would affect grain size choice and response bias, with the public context producing fewer coarse-grain preferred responses and a lower response bias index (*c*) than the private context. I predicted that context and audience would interact in their effects upon grain size choice and response bias. In the public – but not

the private – context, high authority presence should produce fewer coarse-grain preferred responses and a lower response bias index (*c*) than with low authority presence.

Additionally, high authority presence group participants should show greater self-presentational concern compared to low authority presence group participants (suggesting that audience was successfully manipulated). I did not make specific predictions regarding monitoring and control. Findings could align with Koriat and Goldsmith's (1996) model or with the previous research findings that run contrary to the model.

## Method

### Participants

Eighty-five Flinders University students (35 men, 48 women and 2 gender unreported) participated in the experiment for payment or course credit. The decision to recruit this sample size was made prior to the commencement of data collection. This practice was followed throughout the thesis. The average age of participants was 22.2 years (*SD* = 5.2 years).

### Design

A 2 (context: public, private) × 2 (audience type: high authority presence, low authority presence) between-groups experimental design was used. Participants' preferred response in phase two of the grain size questionnaire and the response bias index constituted the main dependent variables.

### Materials

**Stimulus video.** The stimulus event was a 30 second, non-violent, mock bank robbery video clip. The video depicted one offender demanding money from a cashier while a second offender waited by the door. After receiving a bag of money, the offenders fled on foot before escaping in a nearby getaway car. Participants viewed the

video on a computer with a 21-in. monitor set at a resolution of 1920 × 1080 pixels. These computers were used in all of the studies of this thesis.

**Grain size questionnaire.** Participants answered 20 questions about the stimulus video content. Seven questions required numeric value answers and 13 questions asked for colours seen in the film. The questions were presented in a paper booklet and participants recorded their answers in the spaces provided. Participants completed the grain size questionnaire in two phases. In phase one, participants were required to provide a fine-grain answer and confidence rating as well as a coarse-grain answer and confidence rating, for each of the 20 questions. Participants were told that one answer should be a very specific detail such as “sky blue” and the other answer should be a broader detail such as “light”. The order in which the fine-grain and coarse-grain questions were posed was counterbalanced throughout the questionnaire. Participants recorded their confidence on a percentage rating scale ranging from 0% to 100%, anchored by “very very unsure” and “very very sure”. See Table 1 for example questions. In phase two, participants were asked to go back through the grain size questionnaire booklet. For every question, participants selected one of their two answers as their preferred response or final answer to the question. That is, participants selected either their fine-grain answer *or* their coarse-grain answer as their preferred response for that question.

Table 1

*Example Questions from Study 1*

| Questions | |
|---|---|
| **What was the colour of the beanie worn by the robber NEAR THE DOOR?**<br><br>General colour_____<br>(light, medium, dark) | **How sure are you that your response is correct? (Please circle)**<br>0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%<br>Very Very Unsure — Half Sure — Very Very Sure |
| | **How sure are you that your response is correct? (Please circle)** |
| Exact colour _____ | 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%<br>Very Very Unsure — Half Sure — Very Very Sure |
| **How many witnesses were in the bank?** | |
| | **How sure are you that your response is correct? (Please circle)** |
| Exact number _____ | 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%<br>Very Very Unsure — Half Sure — Very Very Sure |
| | **How sure are you that your response is correct? (Please circle)** |
| Between _____ and _____<br>(range) | 0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%<br>Very Very Unsure — Half Sure — Very Very Sure |

**Manipulation check.** A 20-item manipulation check questionnaire was used to determine whether the manipulations of context and audience were successful. The manipulation check measure contained an indirect component (6 self-presentation items) and direct component (14 context and audience attribution items). The six self-presentation items and their nine-point likert rating scale were taken from Leary et al.'s (1994) adapted version of the Rochester Interaction Record (RIR). The rating scale had the following labels: 1 = *not at all*; 3 = *slightly*; 5 = *somewhat*; 7 = *quite a lot*; 9 = *very much*. The items measured state self-presentation, that is, self-presentation during the experimental session. Four of the six items assessed four different aspects of self-presentation. Participants indicated the degree to which they wanted to be perceived as likable, friendly and socially desirable; competent, skilled and intelligent; ethical, moral and principled, and; physically attractive, handsome or pretty. The remaining self-presentation items asked participants to rate how much they thought about how they were being perceived during the session and; how nervous or tense they felt.

Of the 14 direct manipulation check items, two items assessed participants' awareness of the deception involved in the experiment. These items were presented in an open-ended format. Participants were asked to list, in the spaces provided, the instructions and information given to them and were asked to record what they thought the point of the instructions and information was.

The remaining 12 direct manipulation check items assessed context and audience attributions. These items also used Leary et al.'s (1994) nine-point rating scale and labels. The six audience attribution items asked participants to rate how authoritative the scorer was, how powerful the scorer was, and; how much status the scorer had. These items were included to investigate how much authority, participants perceived the scorer to have. To disguise the purpose of the questions, filler items asked participants to rate the likability, attractiveness, and friendliness of the scorer.

The six context attribution items asked participants to rate how confidential, private, and anonymous they thought their answers were. These items were included to gauge how private participants perceived the session to be. Participants were also required to rate how public, widely known, and revealed to others, their answers would be. These items provided a measure of how public participants perceived the session to be.

**Experimental Manipulations**

**Context.** Participants were provided with instructions outlining one of two contexts. In the public context, participants were informed that they would be required to read their responses aloud in front of the person scoring their responses (police officer or research assistant) and the other participants in the session, after all participants had completed both questionnaires (cf. Shaw III, Zerr, & Woythaler, 2001). Participants completed the session in groups of two or more to make this manipulation more convincing. Being in public can have additional effects on behaviour (Leary, 1996), potentially confounding results. Accordingly, responses were not actually shared aloud; public group participants were merely led to believe that this was going to occur. To strengthen the manipulation, I placed a sign on the laboratory wall that read “those participants presenting answers to the group please continue to room 112”. I also developed a presenting schedule which dictated the order in which participants would present their answers. Participants in the private context were informed that all answers would remain private and anonymous (cf. Shaw III et al., 2007) and that, upon completion, they should seal their questionnaire in the unmarked envelope provided, before placing it in a box when leaving the laboratory (cf. Paulhus, 1991).

All participants were told that everyone would see a different version of the video, each version would show a different perspective of the same crime and, as a result, all participants would have different information to provide. Informing participants that they would view different versions of the video ensured that public group participants

believed they could not be challenged by the other participants in their group as research indicates that being in public influences behaviour when the eyewitness cannot be contradicted (Shaw III et al., 2007).

**Audience.** Participants also received instructions outlining what type of audience would score the questionnaires. All participants were told that staff from Flinders University and the University of Portsmouth were collaborating on a research grant to develop several new interviewing techniques (one of which was the grain size interview). Participants in the high authority presence condition were informed that the two universities were partnered with local police departments to investigate how these techniques will be applied to actual police interviewing practices. High authority presence participants were told that the experiment was a pilot study designed to familiarise police officers with the new grain size technique and investigate the effectiveness of different scoring methods for the questionnaire. Participants in the high authority presence condition were also informed that a small group of trained police interviewers from South Australia Police (SAPOL) were aiding this experiment and that one of these police interviewers would score their responses.

In contrast, participants in the low authority presence condition were told that the experiment was a pilot study designed to investigate the effectiveness of different scoring methods for the grain size questionnaire. Low authority presence participants were told that a small group of trained student research assistants within the School of Psychology were aiding this experiment and that one of these research assistants would score their responses. In actuality, I scored all responses.

To strengthen this manipulation, I used a media release, confederate, props and signage. The media release provided additional information about the research grant and interviewing practices. The implications for actual police protocol were discussed in the version viewed by high authority presence participants; however, all mention of the

police was removed in the version viewed by low authority presence participants. A 33 year old, male, third year Psychology student was employed as a confederate. The confederate sat marking questionnaires, with his back facing the door, in one of the conspicuous cubicles in the eyewitness laboratory. In the high authority presence condition, the confederate wore navy pants, a blue shirt, a navy jumper, a navy tie and black dress shoes to approximate an Australian police uniform. Inside the cubicle were a police hat and briefcase and a sign on the cubicle door read "police interviewers". In the low authority presence condition the confederate wore jeans, a t-shirt, a casual jumper and sneakers. I removed the police hat and briefcase and changed the sign on the door to "research assistants".

**Procedure**

Participants were recruited from campus in groups of two or more or signed up to a group session via the eyewitness laboratory email list or the School of Psychology first year student research participation system. I conducted the four conditions separately to ensure that participants received and viewed the relevant instructions, signage, props and confederate attire for their condition[1]. Once at the eyewitness laboratory, I provided participants with verbal instructions outlining how the session would proceed before allocating them to one of the individual cubicles within the laboratory. I directly acknowledged the confederate in front of the participants by saying "Steve, the next group of participants has arrived. They are about to get started now", to ensure that all participants noticed the confederate. Participants read the introduction letter and signed the consent form before viewing the stimulus video on a computer screen and completing a word search distracter task. Participants were provided with two paper word searches and were asked to find as many words as possible within two minutes.

[1] While this was unavoidable, it must be noted that as allocation to condition was not completely random, it is possible that the manipulations could have been confounded. While unlikely, it is possible that an unmeasured or undetected factor covaried with the independent variables, affecting the results observed.

Once the two minutes elapsed, the audience instructions were presented on the computer followed by the context instructions. Next, I distributed a paper copy of the grain size interview which contained instructions for completing the questionnaire.[2] Participants commenced phase one of the grain size interview using a black pen. Upon completion of phase one, I cut the confidence ratings from the questionnaire booklet. I removed the confidence ratings to ensure that participants' choice of preferred answer in phase two was not influenced by their phase one confidence ratings. Participants black pen was also swapped for a red one. During phase two participants were asked to go back through each question and select one of their two answers as their preferred response using the red pen. Use of different coloured ink prevented participants from changing their phase one answers during phase two. Once phase two was completed, participants commenced the study overview questionnaire, to measure self-presentation and check manipulations. I then informed public condition participants that they would not be required to read their responses aloud after all. Finally, I thanked and debriefed participants before either reimbursing them or allocated them course credit.

## Statistical Approach

This section explains the statistical analysis approach used in Study 1 and subsequent studies. In all of these studies, participants watched a stimulus video before answering multiple questions about the video content. Participants gave multiple answers, made multiple grain size choices, withheld multiple responses and made multiple confidence ratings. When multiple stimuli (or in this case multiple items) are used, traditional *t* tests and analyse of variance (ANOVA) on aggregate statistics (e.g., proportion correct, mean confidence) can be misleading. Aggregate statistics may not sufficiently reflect the characteristics of the data. They may mask effects that are present or suggest that an effect exists when it in fact does not (Baayen, Davidson, & Bates,

[2] The instructions that outlined how the grain size interview should be completed are presented in Appendix A. These instructions were modified for use in all subsequent studies.

2008). For example, a participant may be 40% confident in half of their responses and 60% confident in the other half of their answers. This participant would have a mean confidence rating of 50%. A second participant may be 100% confident in half of the answers but 0% confident in their remaining responses. This participant would also have a mean confidence of 50%. These two participants have the same mean confidence, however, their patterns of responses differ greatly. The mean reasonably summarises the first participant's range of ratings, however, the mean does not adequately reflect participant two's responses. For this reason, I used a mixed-effects modelling approach for the majority of analyses. Mixed-effects modelling is an extension of regression that considers every participant's decision across every question rather than looking at one participant's average decision or a group of participants' average decision. As every data point is considered in a mixed-effects model (rather than averages), the results obtained are more representative of the pattern of the data (Baayen et al., 2008).

Mixed-effects modelling has two other key advantages, relevant to this work, over traditional data analysis approaches. First, mixed-effects modelling not only allows the inclusion of repeated measures, but also allows the variability within these factors to be explicitly modelled rather than just included as noise or error variance (Baayen et al., 2008). Within this research, the difficulty of the questions answered by participants varied. Accordingly, I entered question as a random factor in the base of every mixed-effects model created. The size of the group that participants were in when participating in Study 1 varied between two to six people so I also entered group size as a random factor in the base of Study 1 models. For each random effect, the model estimated the standard deviation in outcome due to variation in the random effects (Baayen et al.,

2008). This is achieved by allowing the regression to calculate a different intercept[3] coefficient for every level of the random effect.

Second, mixed-effects modelling allows simultaneous examination of multiple predictor variables. This thesis investigated the role of informativeness in the withholding of coarse-grain information. The monitoring and control model (Koriat & Goldsmith, 1996) proposes that confidence guides the decision to volunteer or withhold information. I predicted that informativeness would have an effect over and above confidence, inducing poor control, leading to the withholding of coarse-grain information. Accordingly, I wanted to investigate informativeness after factoring in the influence of confidence. Through mixed-effects modelling, I was able to include confidence in each of my models to examine whether informativeness predicted variance in coarse-grain withholding over the effect of confidence.

I created all mixed-effects models using the lme4 package (Bates, Maechler, Bolker, & Walker, 2013) in R, an open-source language environment for statistic computing (R Development Core Team, 2011). The outcome variable in all of my models was dichotomous, with a binomial distribution (e.g., grain size choice where zero indicates a fine-grain preferred response and one indicates a coarse-grain preferred response). For this reason I used a logit link function to create logistic mixed-effects models, an extension of logistic rather than ordinary regression. In logistic regression, instead of predicting the value of the outcome variable from a predictor variable (like linear regression), we predict the probability of the outcome occurring given known values of the predictor variable (Field, Miles, & Field, 2012).

For each analysis, I first fitted a baseline model to the data that included the intercept and random effects (question and, in some cases, group size). I then added fixed effect predictors that I wanted to control for (e.g., confidence), followed by fixed

[3] The intercept represents the base level of performance when the impact of other predictors is ignored.

effects predictors of primary interest (e.g., informativeness). I then conducted likelihood ratio tests on chi square distributions to assess the improvement of model fit with the addition of predictors (Field et al., 2012). The likelihood ratio assesses deviance between the model predictions and the actual data and determines the reduction in this deviance after the addition of each predictor to the model (Field et al., 2012). Following this, I examined regression coefficients derived from the saturated model (the model that contained all predictors that I was interested in, regardless of whether these predictors improved model fit). I used the saturated model so that I could observe the effect of the individual predictors on the outcome once all variables considered to be important were included in the model. I primarily focused on regression coefficients when interpreting effects (as opposed to model fit) as the coefficients reflect variance in the outcome when all important predictors are taken into consideration (Gelman & Hill, 2007).

Each regression coefficient (*b*) indicates the effect of an individual predictor on the outcome variable. Specifically, the value of *b* represents the amount of change in the log odds of the outcome with a one unit change in the predictor (Field et al., 2012). With a dichotomous, binomial predictor (e.g., context where zero represents the private condition and one the public condition), *b* indicates how much the slope of the line of best fit is likely to change between conditions. I then used bootstrapped confidence intervals to determine whether the *b* was significantly different from zero. I interpreted an effect as significant if the confidence interval did not contain zero. For categorical predictors, this indicates whether there was a significant difference between groups and for continuous predictors this indicates whether the predictor was significantly related to the outcome. Bootstrapping repeatedly takes a random sample from the data and fits the model (i.e., calculates all coefficients) to this sample. It then uses these multiple calculations of the coefficients to determine a confidence interval representing the error

in our estimate of the coefficient (Canty & Ripley, 2013). I obtained confidence intervals using bootstrapping because the distributional properties of the coefficients in mixed-effects models are unknown, therefore, significance tests that assume normal distributions cannot be used. Confidence intervals were calculated on 1,000[4] bootstrap samples using the first order normal approximation implemented in the boot package for R (Canty & Ripley, 2013). Finally, when my predictor of interest (informativeness in most models) significantly predicted the outcome, I calculated odds as an indicator of effect size. Using odds, I was able to state exactly how much more likely the outcome was to occur in one condition compared to the other.

I used mixed-effects modelling whenever participants had multiple data points for the same variable (e.g., when participants answered multiple questions or completed the same measure multiple times). I used traditional *t* tests and ANOVAs when participants did not have multiple data points for the same variable (typically manipulation checks). An alpha level of .05 was used for all inferential analyses, and I reported Cohen's *d* and *f* as measures of effect size for *t* tests and ANOVAs, respectively. The suggested guidelines for inferring small, medium, and large effects are 0.2, 0.5, and 0.8 for *d* and 0.10, 0.25 and 0.40 for *f* (Cohen, 1988). As recommended by Tabachnick and Fidell (2013), I reported 95% confidence intervals for *d*. I reported Cronbach's alpha as a measure of reliability, with scores above .7 considered reliable (Pallant, 2005).

## Results

Cases where the fine-grain answer was correct and the coarse-grain answer incorrect ($N$ = 51 items, 3% of answers) were excluded from analyses. I excluded these responses to ensure that participant guessing, confusion and errors did not influence results. I followed this practice throughout the thesis.

[4] I used 1000 bootstrap samples for practicality. A thousand samples are enough to give stable estimates of the confidence interval and can be calculated in one day. Any small increase in the stability of estimates gained from using more samples is outweighed by the length of time it would take to calculate the confidence intervals (Davison & Hinkley, 1997).

**Manipulation Checks**

**Context.** All participants rated how public they believed the session to be, across three items. That is, participants rated how public they thought their answers were, the degree to which they thought their answers would be widely known and how much they thought their answers would be revealed to others. All participants also rated the privacy of the session across three items. Specifically, participants rated how confidential, private and anonymous their answers were. I reverse scored the three privacy items and combined the three public items with the three reverse scored private items to form a measure of publicness. I predicted that public group participants would rate the session as more public compared to private group participants. The public measure ($\alpha$ = .87) was internally consistent. Accordingly, I combined items to form a total publicness score for each participant. I then converted these scores back to their original scale so that I could interpret any differences between the two groups using the original scale and anchors. Using an independent samples *t* test, I ascertained whether there was a difference between the public and private groups on this publicness score. Results revealed a significant difference between the groups in ratings of publicness, $t(75.09) = -7.57$, $p < .001$, $d = 1.75$, $d$ 95% CI [1.24, 2.25]. Compared to private group participants ($M = 2.75$, $SD = 1.36$), participants in the public condition rated the session as more public ($M = 5.52$, $SD = 1.95$). These results suggest a successful manipulation of context.

**Audience.** I expected that high authority presence participants would believe that a police officer would be scoring their responses and would rate their scorer as having greater authority, compared to low authority presence group participants. All participants rated the scorer on a series of attributes, three of which were authority related (how authoritative the scorer was, how powerful the scorer was, and; how much status the scorer had). I combined these three items to form a measure of authority ($\alpha$

=.81), converted this measure to its original scale and used an independent samples *t* test to ascertain whether the authority score differed significantly between the high and low authority presence groups. Contrary to prediction, the high authority presence (*M* = 5.46, *SD* = 1.53) and low authority presence (*M* = 4.89, *SD* = 1.58) groups did not differ significantly in their ratings of authority *t*(83) = -1.69, *p* = .096, *d* = 0.37, *d* 95% CI [-0.06, 0.80]. While this result potentially indicates that my manipulation of audience was unsuccessful, it must be noted that asking participants their thoughts about the audience manipulation may have acted as a cue to the deception involved. When completing the audience attributions component of the manipulation check questionnaire, participants may have begun to doubt the authenticity of the scorer instructions. To avoid appearing as though they had been deceived, high authority presence participants may have rated the scorer as having little authority.

To combat this, I measured state self-presentation as an additional, indirect, bias free manipulation check for audience. If the audience manipulation was successful and high authority presence participants believed that a police officer would be scoring their responses, high authority presence participants should show greater self-presentational concerns compared to low authority presence participants. The six self-presentation items formed an internally consistent measure ($\alpha$ = .79). Accordingly, I combined the items to form a self-presentation score, converted this score to its original scale and used an independent samples *t* test to determine whether this score differed significantly between the high and low authority presence groups. Consistent with prediction, high authority presence participants were significantly more concerned with how they were perceived (*M* = 5.04, *SD* = 1.30) compared to low authority presence participants [*M* = 4.08, *SD* = 1.46; *t*(83) = -3.22, *p* = .002, *d* = 0.71, *d* 95% CI [0.27, 1.15]]. Varying image concern suggests that the two groups differed in who they believed they were conveying an image to. This indicates that the two groups trusted that different bodies

would be scoring their responses and provides support for the effectiveness of the audience manipulation.

**Grain Size Choice**

As outlined earlier in this Chapter, I predicted that context and audience would affect grain size choice over and above the influence of confidence. To test this, I created a logistic mixed-effects model with phase two preferred response as the outcome variable. I entered confidence in fine-grain information as the first predictor, audience as the second predictor, context as the third predictor and the interaction between audience and context as the fourth predictor. See Table 2 for model fit statistics and Table 3 for fixed effect coefficients.

Table 2

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Context and Audience Affected Grain Size Choice*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in fine-grain information | 297.58 | 1 | <.001 |
| Audience | 2.07 | 1 | .151 |
| Context | 11.28 | 1 | .001 |
| Audience × Context | 0.53 | 1 | .468 |

Table 3

*Fixed Effects Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Context and Audience Affected Grain Size Choice*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 0.25 | .22 | [-0.16, 0.69] |
| Confidence in fine-grain information | -0.04 | .00 | [-0.05, -0.04] |
| Audience | 0.29 | .18 | [-0.05, 0.64] |
| Context | 0.52 | .18 | [0.18, 0.87] |
| Audience × Context | -0.19 | .25 | [-0.68, 0.30] |

*Note*. The model included question (*SD* = 0.71) and group size (*SD* = 0.10) as random effects. Confidence was measured on a percentage rating scale, ranging from 0 to 100 percent. Ten percent increments were labelled on the scale and available as a response options.

The regression coefficient indicated that context significantly predicted grain size choice. However, contrary to prediction, private group participants were more likely than public group participants to volunteer fine-grain preferred responses. Using the regression and intercept coefficients, I calculated the odds of private and public group participants volunteering a fine-grain preferred response. The odds indicated that private group participants (2.17) were almost two times more likely than public group participants (1.29) to volunteer fine-grain preferred responses. The direction of this relationship was consistent with the aggregate statistics. For the public group, the mean proportion of phase two preferred responses that were fine-grain was .35 (*SD* = .15). For the private group, the mean proportion of phase two preferred responses that were fine-grain was .43 (*SD* = .16). Aggregate statistics also demonstrated that, for the public group, the mean proportion of phase two preferred responses that were accurate was .63 (*SD* = .13). For the private group, the mean proportion of phase two preferred responses that were accurate, was .57 (*SD* = .14). At face value, this result suggests that a greater

motivation for informativeness and more coarse-grain withholding occurred in private than public. The regression coefficient suggested that, contrary to prediction, audience did not significantly predict grain size choice. This was also reflected in the aggregate statistics. For the high authority presence group, mean proportion of phase two preferred responses that were fine-grain was .37 (*SD* = .17). For the low authority presence group, mean proportion of phase two preferred responses that were fine-grain was .40 (*SD* = .15). This suggests that the manipulation of audience did not affect grain size choice.[5] Similarly, results indicated that the interaction between audience and context did not significantly predict grain size choice. Finally, the regression coefficient indicated that confidence in fine-grain information significantly predicted grain size choice. Specifically, the more confident participants were in their fine-grain information, the more likely they were to select this fine-grain answer as their preferred response. This was consistent with Goldsmith et al.'s (2005) findings and model and supports the testing of context and audience over the influence of confidence.

The relationship between confidence in phase one fine-grain and coarse-grain answers and proportion of phase two responses that were coarse-grain, is plotted in Figure 1. Fine-grain confidence was of primary interest; however, coarse-grain confidence was included to obtain a complete understanding of the effects of confidence. I used coarse-grain proportion as the dependent variable to represent pictorially the results in a way that was consistent with the theoretical grounding and hypotheses. I computed the frequency of judgements within each confidence category separately for fine-grain answers and coarse-grain answers. Of these judgements, I calculated the frequency in which the coarse-grain answer was volunteered. I then divided the frequency that the coarse-grain answer was volunteered by the frequency of

[5] I recreated the model above with a trimmed sample ($N$ = 42 participants were excluded because they were in the high authority group and their total authority rating was ≤ 5 or they were in the low authority group and their total authority rating was ≥ 5). Results confirmed that audience did not affect grain size choice, even when the participants who seemed to not believe the manipulation were excluded from analyses $\chi^2(1) = 2.07$, $p = .151$, $b = 0.29$, $SE_b = .18$, 95% CI [-0.05, 0.64].

judgements within the confidence interval to obtain the proportion of coarse-grain answers volunteered within each confidence category. The frequency of judgements in each confidence category appears with each data point.

Consistent with the mixed-effects model results above and Koriat and Goldsmith's (1996) model, Figure 1 depicts a negative association between confidence and grain size choice. Specifically, the more confident participants were in their fine-grain answer, the less likely they were to select a coarse-grain preferred response.

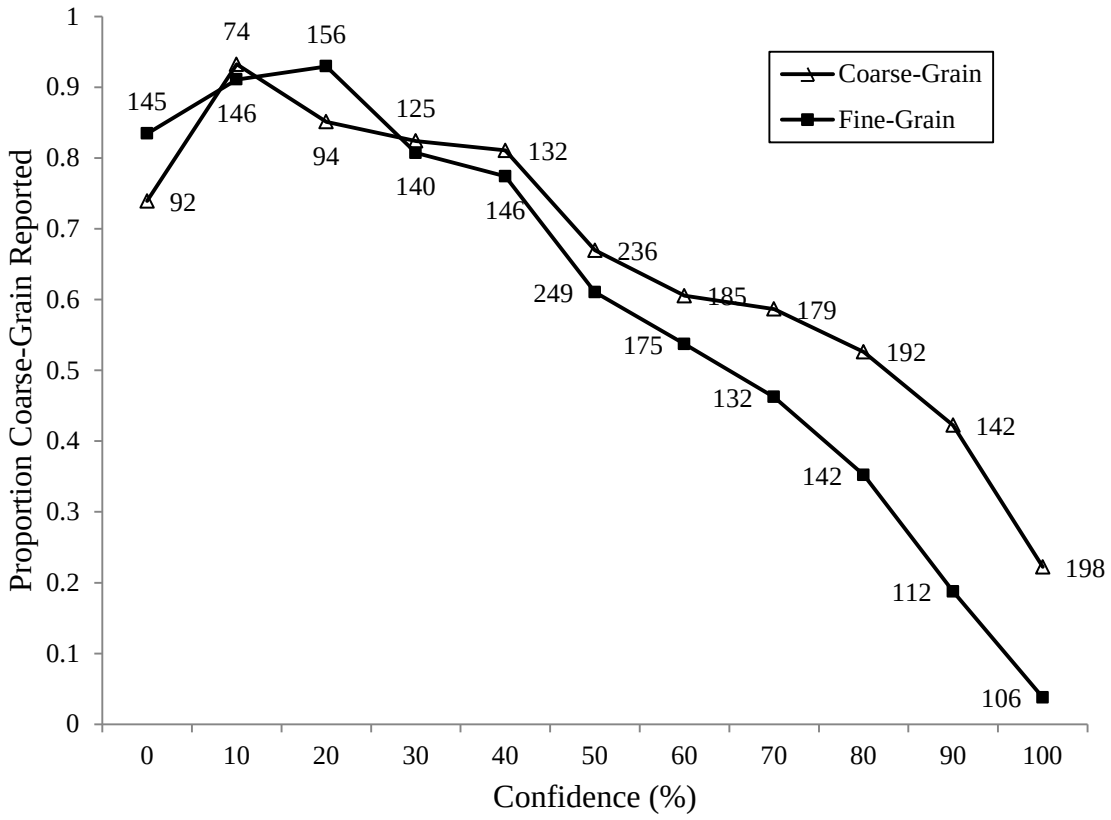


*Figure 1.* Relationship between phase one confidence and phase two coarse-grain preferred responses for all participants

**Response Bias and Discriminability**

Grain size results indicated that private group participants were more likely to volunteer fine-grain preferred responses (and in the process withhold coarse-grain

preferred responses), compared to participants in the public group. Using Type-2 signal detection analyses, I ascertained why private group participants withheld this information. Type-2 signal detection analyses distinguish between fine-grain preferred responses that are volunteered for accuracy purposes, because the fine-grain answer was correct (discriminability), versus providing fine-grain preferred responses because of a tendency to report fine-grain information regardless of whether it was accurate (response bias).

Using Stanislaw and Todorov's (1999) formula, a response bias (*c*) and discriminability index (*d'*) was calculated for each participant. I then ascertained whether the public and private groups differed on these indices. To calculate response bias and discriminability indices, the number of hits, false alarms, misses and correct rejections made by each participant was calculated. A hit occurred when the fine-grain information was correct and the fine-grain information was volunteered. A false alarm occurred when the fine-grain information was incorrect but volunteered. A miss occurred when the fine-grain information was correct but the coarse-grain information volunteered. Lastly, a correct rejection occurred when the fine-grain information was incorrect and the coarse-grain information volunteered. The hit rate was calculated by dividing the number of hits by the number of hits plus the number of misses, and the false alarm rate was calculated by dividing the number of false alarms by the number of false alarms plus the number of correct rejections. For several participants, the hit or false alarm rate equalled zero. This prevented computation of response bias and discriminability indices. Accordingly, I added 0.5 to the number of hits, false alarms, misses and correct rejections and recalculated the hit and false alarm rates. Once hit and false alarm rates had been calculated, response bias and discriminability indices were computed for every participant, using Stanislaw and Todorov's formula. A lower response bias index is indicative of a greater tendency to respond in a particular way

(greater tendency to report fine-grain information) (Stanislaw & Todorov, 1999). A higher discriminability index is indicative of a greater ability to distinguish correct from incorrect responses (greater accuracy) (Stanislaw & Todorov, 1999).

Once response bias and discriminability estimates for participants were established, I used a 2 (context: public, private) × 2 (audience: high authority presence, low authority presence) between groups ANOVA, with response bias as the dependent variable, to examine the effects of context and audience on participants' tendencies to respond in a particular way. Descriptive statistics are reported in Table 4. The main effect of context was significant, $F(1, 81) = 4.39$, $p = .039$, $f = 0.23$, with private group participants exhibiting a lower response bias index ($c$) compared to the public group participants. This indicates that private group participants demonstrated a greater tendency to report fine-grain information, compared to public group participants. In contrast, the main effect of audience was nonsignificant, $F(1, 81) = 1.31$, $p = .256$, $f = 0.18$, as was the interaction between context and audience, $F(1, 81) = .64$, $p = .427$, $f = 0.09$.

Table 4

*Response Bias Indices (c) by Context and Audience*

| | Context | | | | | |
|---|---|---|---|---|---|---|
| | Public | | Private | | Overall | |
| Audience | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| High authority presence | .33 | .52 | .21 | .45 | .27 | .48 |
| Low authority presence | .30 | .32 | .02 | .43 | .17 | .40 |
| Overall | .31 | .42 | .12 | .45 | | |

I also used a 2 (context: public, private) × 2 (audience: high authority presence, low authority presence) between groups ANOVA, with discriminability as the dependent variable, to investigate the effect of context and audience on accuracy. The main effects of context, $F(1, 81) = .00$, $p = .995$, $f = 0.00$, audience, $F(1, 81) = .91$, $p = .344$, $f = 0.11$, and the interaction between context and audience, $F(1, 81) = 1.37$, $p = .246$, $f = 0.13$, were all nonsignificant. See Table 5 for all descriptive statistics. This suggests that there was no difference in withholding of coarse-grain information for accuracy purposes, between the two groups.

Table 5

*Discriminability Indices (d') by Context and Audience*

| | Context | | | | | |
|---|---|---|---|---|---|---|
| | Public | | Private | | Overall | |
| Audience | *M* | *SD* | *M* | *SD* | *M* | *SD* |
| High authority presence | .64 | .60 | .78 | .50 | .71 | .55 |
| Low authority presence | .90 | .49 | .76 | .63 | .83 | .56 |
| Overall | .77 | .56 | .77 | .56 | | |

Taken together, the response bias and discriminability results suggest that private group participants withheld coarse-grain information because they were biased towards reporting fine-grain information, not because by withholding coarse-grain information they volunteered accurate fine-grain information.

**Monitoring and Control**

In addition to determining whether context and audience predicted coarse-grain withholding and establishing whether this coarse-grain withholding was beneficial or

detrimental to memory reporting, I also ascertained which aspect of the monitoring and control model was affected, allowing coarse-grain information to be withheld.

Results from the model investigating the effects of context and audience on preferred responses indicated that confidence significantly predicted grain size choice. Specifically, when participants were confident in fine-grain information, they were more likely to select this fine-grain information as their preferred response. This is in line with Goldsmith et al.'s (2005) addition to the monitoring and control model and suggests that coarse-grain information was not withheld through poor confidence estimation.

Additionally, I investigated participants' ability to monitor. If participants were able to monitor the accuracy of information reasonably successfully, it would suggest that coarse-grain information was not withheld through deficient monitoring. I generated a logistic mixed-effects model to test this. I entered accuracy (for both fine and coarse-grain answers together) as the outcome variable and confidence (for both fine and coarse-grain answers) as the predictor. Confidence significantly improved the fit of the model $\chi^2(1) = 88.04$, $p < .001$. The regression coefficient indicated that confidence significantly predicted accuracy $b = 0.02$, $SE_b = .00$, 95% CI [0.02, 0.03], intercept $b = -0.72$. ($SE_b = .32$), item $SD = 1.33$, groups size $SD = 0.19$. Specifically, when confidence was high, so too was the probability that the response would be accurate. This suggests that participants were able to monitor the accuracy of their retrieved information successfully. Taken together, these results indicate that coarse-grain information was not withheld through flawed confidence estimation or poor monitoring ability. Instead, these results indicate that perhaps coarse-grain information is withheld through ineffective control and defective decision making.

## Discussion

Study 1 examined a social-motivational account to ascertain why coarse-grain information is withheld from eyewitness memory reports. Memory report literature conceptualises informativeness as the amount of detail provided (specificity) (Goldsmith et al., 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995) and suggests that coarse-grain information is withheld because people are motivated to be specific and fine-grain information is more specific than coarse-grain details (Yaniv & Foster, 1995). This motivation to be informative varies with social context and anticipated audience (Ackerman & Goldsmith, 2008). Accordingly, in Study 1, I manipulated context through response privacy (private, public) and audience through authority presence (low authority presence, high authority presence) to determine whether motivation for informativeness affected grain size choice.

Results indicated that contrary to prediction, private group participants were significantly more likely to select fine-grain preferred responses (and withhold coarse-grain information) compared to public group participants. Further, participants were more likely to withhold coarse-grain information in private because they possessed a bias towards reporting fine-grain information. These findings demonstrate the strength of the motivation to be informative. I did not expect to observe motivation for informativeness in the private condition as within this context there is no one around to be informative for. These results demonstrate that the motivation for informativeness is not constrained by social context. That is, the motivation for informativeness is just as strong, in fact actually stronger, when alone. Research suggests that people manage the impressions they convey less, when alone and anonymous (Paulhus, 1984). Accordingly, people's natural preferences and biases may emerge more when they are alone and their image does not need to be managed. Accordingly, within this research, people may have a natural tendency or bias towards being informative. This bias may be

ever-present, but, unconstrained in private. When alone and recognising that all responses will be anonymous and confidential, people may be more willing to risk being inaccurate. That is, when in private, participants knew that there would be no consequences for their responses and that they could not be penalised for any mistakes. Accordingly, participants could respond, unconstrained, in a manner consistent with their natural bias towards fine-grain information and specificity. Results also indicated that audience type did not significantly affect grain size choice. It is possible that Study 1 participants perceived both types of audience (police officers and research assistants) as some form of expert, preventing the manipulation of audience from affecting responses. Alternatively, this null finding may suggest that audience type does not impact the motivation to be specific and informative. Perhaps the motivation to be informative is resistant to changes in audience and is pervasive to the extent that the audience the eyewitness is recollecting for is trivial. Study 1 results also indicated that confidence estimation and monitoring ability were sound; suggesting that motivation for informativeness may have led to the withholding of coarse-grain information by affecting the process of control and provoking poor decision making.

Study 1 findings have several important theoretical implications for the eyewitness memory report literature. First, Study 1 findings provided preliminary evidence that eyewitnesses sometimes withhold coarse-grain information from their memory reports because they are motivated to be informative. To my knowledge, Study 1 was the first to empirically test why coarse-grain information is withheld. Study 1 results therefore offer empirical support that the assumptions and discussion in the literature regarding why this information is withheld are indeed correct.

Second, Study 1 results provide evidence indicating that this motivation for informativeness is strong and internally driven to the extent that it is not constrained by social context. To date, little is known about coarse-grain withholding and fine-grain

preference. Accordingly, Study 1 findings offer important insight into this bias and behaviour and provide us with greater understanding about why eyewitnesses at times behave this way.

Lastly, Study 1 results provide insight into the mechanisms at play when coarse-grain information is withheld. These results suggest that motivation for informativeness perhaps leads to the withholding of coarse-grain information by affecting the process of control. This provides us with an idea of what the boundary conditions of Koriat and Goldsmith's model (1996) are, and provides insight into why discrepancies between the model and other research findings that noted the withholding of coarse-grain information, arose. We now know that the monitoring and control model fails to predict some reporting (when coarse-grain information is withheld) because the model does not account for the motivation to be informative. This suggests that perhaps the model should be expanded to include the role of informativeness in order to increase its ability to predict memory reporting behaviour.

Study 1 clearly demonstrated the strength of the motivation to be informative and provided evidence suggesting that coarse-grain information is at times withheld because of this motivation. The pervasiveness of the motivation to be informative needs to be investigated further. Additionally, subsequent research needs to establish whether this motivation can be changed, and reporting of coarse-grain information increased. Accordingly, in Study 2 I tested conditions whereby coarse-grain information was more valuable than fine-grain information in order to ascertain whether fine-grain preference is abandoned when not adaptive and to determine whether coarse-grain reporting can be improved.

# CHAPTER 3

## Study 2: Adaptiveness of the Motivation to be Informative

Study 1 investigated why eyewitnesses sometimes withhold coarse-grain information from their memory reports. The memory reporting literature suggests that coarse-grain information may be withheld because it lacks informativeness. Memory reports are considered to be informative if they are specific or precise, with fine-grain information being more specific than coarse-grain information (Yaniv & Foster, 1995). Further, the literature suggests that people are motivated to be specific (Grice, 2002), potentially explaining why coarse-grain information is at times withheld from eyewitness memory reports. This motivation for specificity is likely to vary with context and audience. What is considered to be a socially appropriate response in one situation with one type of audience will differ from what is considered acceptable under alternative circumstances with a different audience (Ackerman & Goldsmith, 2008). Accordingly, Study 1 manipulated social context and anticipated audience to examine the effect of social motivations on the reporting of fine and coarse-grain memory reports.

Results indicated that participants withheld coarse-grain information from their memory reports, through over-selecting fine-grain information as their preferred responses. However, surprisingly, this coarse-grain information was withheld within a context where participants had no need to be informative. This suggests that the preference for fine-grain information was resistant to social context. Further this coarse-grain information was withheld because participants had a bias towards reporting fine-grain information, providing evidence that people withhold coarse-grain information because they are motivated to be informative.

Study 2 tested the pervasiveness of the preference for specificity. In particular, I examined whether participants would still prefer fine-grain responding when conditions

were unfavourable for doing so and fine-grain information was neither adaptive nor valuable. In the process, I also ascertained whether reporting of coarse-grain information could be increased. Study 2 extended Study 1 in two other important ways. First, coarse-grain withholding was measured in two ways to obtain a more sensitive and complete understanding of information reporting. Second, detailed interviews were conducted with participants to establish what they believed motivated their responses.

**Informativeness**

Study 2 determined whether the preference for specificity would be abandoned when fine-grain responses were not adaptive, ascertaining whether participants continued to prefer fine-grain information when coarse-grain information became the more valuable choice. To test this, the value of coarse-grain information was modified by manipulating the lighting conditions in the crime video viewed by participants. In the good lighting condition, participants were able to see everything clearly, making fine-grain information the better choice. Alternatively, in the poor lighting condition, it was difficult for participants to see specific details, making the coarse-grain answer the more adaptive and valuable option.

**Measuring Coarse-Grain Information Withholding**

In Study 1, coarse-grain information was considered withheld if fine-grain information was volunteered. This conceptualisation is based on the premise that if participants could retrieve fine-grain information they should also have access to coarse-grain information (e.g., if the participant recalls that the offender's pants were black they can infer that the pants were dark). Therefore, when providing a fine-grain answer, participants are theoretically withholding a coarse-grain answer that is available in memory. However, participants may not always be able to retrieve coarse-grain information when retrieving fine-grain details. A participant may recall that the offender wore a green shirt (fine-grain) but may not be able to recall whether the shirt was dark

or light coloured (coarse-grain). Indeed, three percent of answers were excluded in Study 1 as the fine-grain answer was correct but the coarse-grain answer incorrect. This suggests that participants do not always retrieve fine and coarse-grain information together and that volunteering fine-grain information does not necessarily equate to withholding coarse-grain information.

In Study 2, I developed a different mode of memory reporting to measure coarse-grain information withholding more sensitively. Participants first answered grain size questions under free report. Like Study 1, participants were asked a series of questions about the stimulus video content and were asked to respond with both a fine and coarse-grain answer. However, unlike Study 1, participants were told that they did not have to answer all of the questions. Participants were provided with a "don't know" response option. This allowed them to choose whether they would report an answer or withhold this answer by selecting "don't know". Following this, participants answered the same questions under forced report. Participants were asked to go back through the questionnaire and provide a response for any of the questions to which they responded "don't know" during the free-report phase. Participants were told that every single question should be answered during forced reporting. The combined report option format allowed more sensitive measurement of coarse-grain information withholding. When participants withheld an answer under free report but volunteered it under forced report, the participant had this information available in memory but chose to withhold it from their initial report.

In addition to completing the questionnaire under free and forced-report instructions, participants also selected a preferred response for every question. The free-, followed by forced-, report format allowed for a more sensitive measure of information withholding. However, due to social pressures to provide information, participants may not have taken full advantage of the "don't know" option (Ackerman

& Goldsmith, 2008). Had participants provided all answers during free report and had the free-, followed by forced-, report format been my only measure of withholding, I would have been unable to measure the dependent variable. For this reason and to maintain consistency with Study 1, participants also selected their preferred responses upon completion of the forced-reporting phase.

I intentionally used free report, where participants chose whether they answered questions (Koriat & Goldsmith, 1994), rather than free recall, where participants record everything they can remember and there are no questions (Gabbert et al., 2009). The combination of free-report and forced-report formats allowed direct comparisons between responses. Through this format, it was immediately apparent whether information had been withheld. Additionally, free-report and forced-report formats use the same question prompts. If participants reported information during forced report but not free report, it would indicate that the information was withheld during free report as both formats have the same question prompts. In comparison, free recall has no question prompts. As a result, reporting coarse-grain information during forced report but not free recall may not necessarily be indicative of information withholding. The participant may have reported the information during forced report because the question prompted their memory for the item. In comparison, they may not have reported the information during free recall because no prompt was provided.

**Motivational Factors**

In Study 1 two social factors were manipulated in quite specific ways. Whether these manipulations, and the motivational influences they were designed to tap, would adequately capture the possible array of influences on coarse-grain withholding, was unknown. In contrast, Study 2 investigated the motivations underlying memory reporting more broadly by examining participants' reasons for their responses after the event, rather than manipulating one or two of these factors.

Based on the theory and research reviewed above, I expected that variations in stimulus lighting would affect coarse-grain information withholding and grain size choice. I predicted that, compared to the good lighting group, participants in the poor lighting condition would volunteer more coarse-grain information, and provide fewer fine-grain preferred responses. This would suggest that coarse-grain information is volunteered when it is the more informative option and the fine-grain preference abandoned when it is not adaptive.

In line with the results of Study 1, I predicted that participants would withhold coarse-grain information through ineffective control. That is, I expected that coarse-grain information would not be withheld through poor confidence estimation or deficient monitoring. I expected that when participants were confident in a piece of retrieved information, this information would be more likely to be accurate and more likely to be volunteered compared to information held with low confidence.

## Pilot Study

I conducted a pilot study to ensure that, when watching the poor lighting stimulus video, it was difficult to see fine-grain details but coarse-grain information could still be determined. That is, it should be more difficult for participants in the poor lighting condition to detect fine-grain details, compared to participants in the good lighting condition. Accordingly, I predicted that, when reporting fine-grain information, participants in the good lighting condition would be more accurate compared to participants in the poor lighting condition. In contrast, I expected that participants in both the good lighting and poor lighting conditions would be able to see coarse-grain details equally well. Thus, when reporting coarse-grain information, accuracy for the two groups should be similar.

## Method

### Participants

Thirty Flinders University students (8 men, 20 women and 2 gender unreported) participated in the pilot study for payment. The average age of participants was 20.6 years (*SD* = 3.7 years).

### Materials

**Stimulus video.** The mock bank robbery video clip from Study 1 was used. The original video was used in the good lighting condition and a second version of the video was created for use in the poor lighting condition. In the poor lighting version, colour was removed and the brightness and contrast were lowered, making all video content appear darker. Apart from the level of stimulus light, all other aspects of the two videos remained the same.

The pilot study was a discrimination task, not a memory task, designed to measure what participants could see, not what they could remember. For this reason, participants completed the questionnaire while watching the video. However, the short duration and pacing of the video events made this task difficult. To ensure that participants could record answers while watching the video, I separated the questionnaire and videos into three sections. For each section, participants received the relevant questions and were told to read through these questions prior to watching the corresponding section of the film. Participants were shown the corresponding section of the film and were asked to record their answers while watching the video. The first film section showed seconds 0-12 of the videos, section two showed seconds 13-20 of the videos and section three showed seconds 21-36 of the videos.

**Grain size questionnaire.** I used 17 of Study 1's 20 questions (explanation for excluding three questions is below). The 17 questions were separated into three sections that corresponded with the three sections of the video. Section one of the questionnaire

asked seven questions regarding things seen in the first section of the video. Section two of the questionnaire asked seven questions related to things seen in the second section of the video. Finally, section three of the questionnaire required three[6] answers relating to the content of the third video section. For every question, participants were asked to provide a fine and coarse-grain answer. The order in which the fine and coarse-grain questions were posed was counterbalanced throughout the questionnaire.

**Procedure**

I recruited participants from the Flinders University campus and randomly allocated them to one of the two conditions. Once at the laboratory, participants were given verbal instructions outlining how the session would proceed before being allocated to one of the individual cubicles within the laboratory. Once in their cubicle, participants read the introduction letter and completed the consent form before receiving electronic instructions for the task. The instructions included an explanation and examples of what constitutes a fine-grain and coarse-grain response. Participants were informed that the questionnaire contained three segments and were told that they should answer the questions while watching the video. Participants were instructed to answer all 17 questions with both a fine-grain and coarse-grain answer. Participants read section one of the questionnaire before watching section one of the video. Once participants finished answering the section one questions they read through the section two questions before watching the second section of the video. This procedure was repeated for the third section. Once participants had completed the questionnaire they were thanked, debriefed and reimbursed for their time.

## Results

I developed two logistic mixed-effects models to examine the suitability of the dark stimulus video for use in Study 2. In the first model, I entered accuracy in fine-grain

[6] The breakdown of the questions was uneven between sections, as not many of the questions were based on things visible at the end of the film.

information as the outcome variable and lighting condition as the predictor. Model fit statistics indicated that lighting condition significantly improved the fit of the model $\chi^2(1) = 7.56$, $p = .006$. As hypothesised, the regression coefficient indicated that stimulus lighting significantly predicted the accuracy of fine-grain information $b = -0.61$, $SE_b = .23$, 95% CI [-1.06, -0.17], intercept $b = 0.81$ ($SE_b = .45$), item $SD = 1.63$. Specifically, the fine-grain information reported by participants in the good lighting condition was more likely to be correct compared to the fine-grain information reported by participants in the poor lighting condition. Aggregate statistics were consistent with this as participants in the good lighting group provided a greater proportion of accurate answers ($M = .63$, $SD = .10$) compared to those who viewed the video under poor lighting ($M = .52$, $SD = .09$).These findings suggest that it was more difficult to see fine-grain details in the poor lighting video compared to the good lighting video, indicating that the poor lighting video was dark enough to impede view of fine-grain information.

In the second model, I entered accuracy of coarse-grain information as the outcome variable and stimulus lighting as the predictor. Lighting did not improve the fit of this model $\chi^2(1) = 0.81$, $p = .370$. Further, as expected, the regression coefficient indicated that stimulus lighting did not significantly predict coarse-grain accuracy $b = -0.23$, $SE_b = .26$, 95% CI [-0.73, 0.29], intercept $b = 1.90$ ($SE_b = .40$), item $SD = 1.39$. Again, this was consistent with aggregate statistics as the good lighting ($M = .80$, $SD = .08$) and poor lighting groups ($M = .77$, $SD = .08$) reported similar amounts of accurate coarse-grain information. This suggests that both groups could see coarse-grain details equally well, confirming that while the poor lighting video was dark enough to impede view of fine-grain details, it did not affect visibility of coarse-grain information. This indicates that the poor lighting video was suitable for creating a situation whereby coarse-grain information was more valuable and adaptive than fine-grain information.

## Study 2

## Method

### Participants

Eighty[7] Flinders University students (40 men, 38 women and 2 gender unreported) participated for payment or course credit. The average age of participants was 23.1 years (*SD* = 6.6 years).

### Design

A between-groups experimental design was used to examine the effects of stimulus lighting (poor lighting, good lighting), on coarse-grain information withholding and grain size choice.

### Materials

**Stimulus video.** This study used the same videos as the pilot study (the original ANZ mock bank robbery video clip and the darker version of the video).

**Grain size questionnaire.** The grain size questionnaire from Study 1 was used, but altered in three key ways. I removed all instructions from the questionnaire, removed three of the twenty items and added a third phase to the questionnaire. I removed instructions from the questionnaire and provided the instructions in separate booklets to ensure that participants received the relevant instructions for each report format and to prevent participants from seeing what future phases of the questionnaire entailed. One handout contained free-report instructions, another handout contained forced-report instructions and a third handout contained preferred response instructions.

Three items were removed from the grain size questionnaire because they were incompatible with the stimulus lighting manipulation. The removed items asked for judgements about the length of time the robbery took, the length of time it took the

[7] One participant was excluded from analyses after he failed to comply with the experimental protocol and task instructions.

robbers to run to the car and the frequency of times the robber spoke. The stimulus lighting manipulation would have been unable to affect the value of coarse-grain information for judgements of time and frequency.

I included a third phase in the grain size questionnaire to accommodate the new measure of coarse-grain withholding. Unlike Study 1, participants completed phase one of the grain size interview under free-report instructions before answering the same questions under forced report (phase two). Finally, in phase three, participants selected a preferred response for every question. Participants completed the three phases on one copy of the grain size questionnaire.

**Motivation scales.** At the end of the session, I interviewed all participants regarding the motivations underlying their grain size responses. I asked participants what they thought guided their answers to the grain size questionnaire. I recorded each motivation reported by a participant, verbatim, in the space provided in their interview booklet. If the participant failed to mention spontaneously any of six key factors (accuracy, informativeness, confidence, evaluation, audience and privacy), I prompted for these factors. I recorded whether each factor was spontaneously volunteered or prompted. The six prompted factors were listed in the literature as potentially important influences on grain size choice. I identified accuracy and informativeness from the accuracy-informativeness trade-off literature, confidence from the monitoring and control model and evaluation, audience and privacy from social psychology literature.

A coding scheme was developed to categorise responses to the motivation interviews. I reviewed every response from every participant and identified 26 response categories. Many of the 26 categories were related. For example, film, questionnaire and filler exercise were three of the 26 categories. These three categories are related as they refer to different aspects of the task and stimuli. Accordingly, I and another, independent scorer, collapsed the 26 original categories into 14 final categories

(accuracy, confidence, informativeness, evaluation, audience, privacy, memory, participant factors, image, guessing, real life, task and stimuli, grain size and other).[8] We collapsed the categories by determining which categories thematically belonged together. When disagreements arose, discussion ensued before a final decision was made. The 14 categories formed the final coding scheme. I then coded all of the interviews into the 14 categories. Responses could be coded into multiple categories and multiple responses within an interview could be coded into the same category. For reliability purposes, a third independent scorer was employed to code 25% of the interviews using the final, 14 category, coding scheme. The third scorer's coding was compared with my coding of the same interviews. We agreed on the exact coding of 81.6% of the responses provided in the interviews. Again, when disagreements arose, discussion ensued before a final decision was made.

After reporting a motivation during the interview, participants rated the extent to which the motivation affected their grain size answers. Participants rated their response using the 9-point rating scale used in the manipulation check measure of Study 1. As multiple responses to the interview could fit within one category, I created a measure of the extent to which each reported category affected participants' responding (this measure is explained in more detail in the Results section of Study 2). There were 30 instances (4.03% of responses) where multiple responses fitted within one category. I also reverse scored ratings if participants mentioned a factor that was phrased in a manner opposite to the coding scheme. For example, confidence was included in the coding scheme and responses such as "I was confident" were scored using the original rating scale. However, ratings for responses that were framed in the opposite manner,

[8] The scheme used to code interview responses is presented in Appendix B. The scheme lists each of the 14 categories, outlines what constitutes an answer within each category and provides examples of responses for each category.

such as “I was unconfident”, were reverse scored. Only 0.4% (*N* = 3) of responses were reverse scored.

**Experimental Manipulation**

As mentioned above, participants viewed a stimulus video containing one of two levels of illumination. Participants in the good lighting condition viewed the original stimulus video used in Study 1. Participants in the poor lighting condition viewed the same video as the good lighting group participants. However, colour was de-saturated and the brightness and contrast were lowered, making all video content appear darker.

**Procedure**

I randomly allocated participants to one of the two video conditions. Participants were given verbal instructions outlining how the session would proceed before being allocated to one of the individual cubicles within the laboratory. In their cubicle, participants read the introduction letter and completed the consent form. Participants then viewed one of the two versions of the stimulus video on the computer. The version viewed was dependent on the condition to which participants were randomly assigned. Following this, participants completed the word search distracter task for two minutes.[9] Once the two minutes elapsed, instructions via the computer told participants to open their cubicle door. Following this, participants received a paper copy of the grain size interview and the phase one (free-report) instructions. In this phase participants were provided with a “don’t know” option. Participants were advised that they did not have to answer every question; they could provide both a fine-grain answer and a coarse-grain answer to a question, one answer only or no answers at all. Participants were informed that if they did not want to provide an answer they should circle the “don’t know” option provided. An explicit description of when the “don’t know” option should be used was not provided and participants were not given specific encouragement to use

[9] Only one word search was provided in Study 2 as the second word search distributed in Study 1 was not used by any of the participants.

this option. Participants completed phase one with a black pen. Upon completion of the first phase, I swapped participants' black pens for red ones and distributed phase two (forced-report) instructions. In this phase, participants were required to go back through the questionnaire and provide an answer for any questions to which they responded "don't know" during phase one. Upon completion of phase two, I removed confidence ratings from the questionnaire and distributed phase three (preferred response) instructions. In this phase, participants selected a preferred response for every question. That is, participants selected either their fine-grain answer or their coarse-grain answer as their final response to that question. Participants completed phase three using a blue pen. I removed confidence ratings to ensure that they did not influence phase three choices. I ensured that participants used different coloured ink to prevent them from changing their responses during subsequent phases and so that I could distinguish between phase one and two responses. Once all three phases of the grain size questionnaire were completed, participants were given the self-presentation measure[10] before being interviewed about the motivations guiding their grain size responses. Finally, all participants were thanked, debriefed and reimbursed, financially or with course credit, for their time.

## Results

In line with Study 1, I excluded items where the fine-grain answer was correct and the coarse-grain answer incorrect ($N$ = 35 items, 2.6% of answers). The pilot test results acted as a manipulation check for the stimulus lighting manipulation. Pilot results indicated that the poor lighting video was dark enough to impair ability to determine fine-grain details but not too dark to impinge upon the visibility of coarse-grain information. That is, stimulus lighting was successfully manipulated. I was unable to

[10] Participants completed the same self-presentation measure as used in Study 1. However, this measure was not relevant to the focus of this study so is not discussed further.

test this in Study 2, as the grain size questions formed a memory task, not a discrimination task.

**Withholding of Coarse-Grain Information**

Each of the 80 participants were asked 17 coarse (and fine) grain questions about the video content. Accordingly, 1360 coarse-grain questions were posed in Study 2. During phase one (free report), participants were able to provide an answer or, alternatively, could circle the “don’t know” option available. Coarse-grain information was considered to be withheld if the “don’t know” option was circled. In response to these 1360 coarse-grain questions, the “don’t know” response option was circled 213 times. That is, participants withheld 213 (15.7%) coarse-grain answers in Study 2.

I ascertained whether stimulus lighting affected the withholding of this coarse-grain information. The monitoring and control model suggests that confidence guides the decision to report or withhold information (Koriat & Goldsmith, 1996). However, I predicted that stimulus lighting had an effect beyond confidence and that this effect led to the withholding of coarse-grain information. Accordingly, when investigating stimulus lighting, I controlled for confidence. That is, I determined whether stimulus lighting predicted the withholding of coarse-grain information, over and above the influence of confidence in coarse-grain information. I ascertained this using a logistic mixed-effects model. Consistent with Study 1, only instances where fine-grain information was withheld under free report were included in the model, and withholding of coarse-grain information was entered as the outcome variable. As outlined above, I considered coarse-grain information withheld if it was volunteered under forced report but not free report. I entered confidence in coarse-grain information as the first predictor and the lighting manipulation as the second predictor. Model fit statistics can be viewed in Table 6 and fixed effect coefficients in Table 7.

Table 6

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Stimulus Lighting Affected the Withholding of Coarse-Grain Information*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in coarse-grain information | 324.12 | 1 | <.001 |
| Stimulus lighting | 4.22 | 1 | .040 |

Table 7

*Fixed Effect Coefficients for the Saturated Logistic Mixed-Effects Model Investigating Whether Stimulus Lighting Affected the Withholding of Coarse-Grain Information*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 2.86 | .23 | [2.4, 3.30] |
| Confidence in coarse-grain information | 0.06 | .00 | [0.05, 0.07] |
| Stimulus lighting | -0.39 | .19 | [-0.77, -0.01] |

*Note*. The model included question (*SD* = 0.49) as a random effect.

Inspection of the regression coefficient indicated that stimulus lighting was a significant predictor of coarse-grain withholding. However, contrary to prediction, participants in the poor lighting group were more likely to withhold coarse-grain information compared to participants in the good lighting condition. Using the regression and intercept coefficients, I calculated the odds of the poor and good lighting groups withholding coarse-grain information. The odds indicated that poor lighting group participants (17.56) were 1.5 times more likely to withhold coarse-grain information, compared to good lighting group participants (11.82). Aggregate statistic reflected this pattern as the poor lighting group withheld, on average, 3.08 (*SD* = 2.29)

coarse-grain responses, while the good lighting group withheld an average of 2.31 (*SD* = 2.12) coarse-grain responses. However, in conflict with the model results, an independent samples *t* test indicated that the difference in mean coarse-grain withholding between the two groups, was not significant. It must be noted though, that the *t* test was only able to ascertain whether stimulus lighting predicted mean coarse-grain withholding across 17 items. As I explained in the statistical approach section of Chapter 2, means can sometimes be misleading in situations like this when participants are answering multiple questions. In light of this, more weight should be placed on the results of the mixed-effects model rather than the *t* test. As coarse-grain information was the more adaptive option under poor lighting, the model results suggest that participants continued to withhold coarse-grain information, even when it was the more valuable option. This indicates that coarse-grain information was withheld because people are motivated to be specific and informative. Further, the preference for fine-grain information was pervasive and non-discriminant, persisting even when not adaptive. As predicted, and in confirmation of Study 1, the confidence coefficient indicated that confidence in coarse-grain information significantly predicted coarse-grain withholding. Specifically, the more confident participants were in their coarse-grain information, the more likely they were to volunteer this response in their memory report. These results suggest that the preference for specificity is strong and that the motivation for informativeness affects reporting over and above the influence of confidence.

**Grain Size Choice**

In addition to investigating coarse-grain withholding, I also ascertained whether stimulus lighting affected grain size choice. I measured grain size choice to maintain consistency with Study 1 and as a subsequent outcome variable in case the social pressure to provide an answer inhibited participants from circling “don’t know” during free report (Ackerman & Goldsmith, 2008). The model of monitoring and control

suggests that confidence in fine-grain information drives the decision regarding which grain size information should take (Goldsmith et al., 2005). Accordingly, I examined whether stimulus lighting affected grain size choice over and above the previously documented effect of confidence (cf. Goldsmith et al., 2005). I tested this by creating a logistic mixed-effects model, with phase three preferred responses as the outcome variable, confidence in fine-grain information as the first predictor variable and stimulus lighting as the second predictor. See Table 8 for model fit statistics and Table 9 for fixed effect coefficients.

Table 8

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Stimulus Lighting Affected Grain Size Choice*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in fine-grain information | 305.29 | 1 | <.001 |
| Stimulus lighting | 0.04 | 1 | .838 |

Table 9

*Fixed Effect Coefficients for the Saturated Logistic Mixed-Effects Model Investigating Whether Stimulus Lighting Affected Grain Size Choice*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 0.54 | .18 | [0.18, 0.89] |
| Confidence in fine-grain information | -0.04 | .00 | [-0.05, -0.04] |
| Stimulus lighting | 0.03 | .14 | [-0.24, 0.32] |

*Note*. The model included question (*SD* = 0.62) as a random effect.

The regression coefficient indicated that stimulus lighting did not significantly predict grain size choice. This was reflected in the aggregate statistics. For the poor lighting group, mean proportion of preferred responses that were fine-grain was .40 (*SD* = .16). For the good lighting group, mean proportion of preferred responses that were fine-grain was .42 (*SD* = .14). In contrast, the regression coefficient indicated that confidence in fine-grain information significantly predicted grain size choice. Specifically, the more confident participants were in their fine-grain information, the more likely they were to select this fine-grain information as their preferred response. This finding supports the confidence mechanism within the monitoring and control model (Goldsmith et al., 2005) and corroborates my investigation of the effect of informativeness over the influence of confidence.

**Monitoring and Control**

In addition to ascertaining whether stimulus lighting affected coarse-grain withholding and grain size choice, I also determined which aspect of the monitoring and control model was involved during the withholding of coarse-grain information. I investigated this by assessing ability to monitor the accuracy of information. If participants were able to monitor successfully, it would suggest that coarse-grain information is not withheld through deficient monitoring. This would support prediction that coarse-grain information is withheld through ineffective control.

To test this, I developed a logistic mixed-effects model. I entered phase two (forced-report) accuracy, in fine and coarse-grain information, as the outcome variable and forced-report confidence, in fine and coarse-grain information, as the predictor variable. Confidence significantly improved the model fit, $\chi^2(1) = 128.90$, $p < .001$, and significantly predicted response accuracy, $b = 0.02$, $SE_b = .00$, 95% CI [0.01, 0.02], intercept $b = 0.36$ ($SE_b = .24$), item $SD = 0.96$. Specifically, the more confident participants were in a response, the more likely this response was to be correct. This

finding confirms Study 1 results and indicates that participants were able to monitor their accuracy successfully. This suggests that coarse-grain information was not withheld because of poor monitoring ability, adding credence to the proposition that ineffective control is responsible for this behaviour.

**Post-Experiment Interviews**

As outlined in the Method section, participants were interviewed at the end of the experimental session and asked what they believed motivated their responses. They rated each of these motivations on a nine-point likert scale, where 1 = *not at all*; 3 = *slightly*; 5 = *somewhat*; 7 = *quite a lot*; 9 = *very much*. Participants were prompted for any of six key factors (accuracy, informativeness, confidence, evaluation, audience and privacy) that they did not spontaneously mention. The frequency with which each of the 14 motivational factors were spontaneously mentioned is shown in Table 10. The factors most frequently spontaneously reported by participants were memory and task and stimuli.

In addition to examining frequencies, I also investigated the extent to which each factor influenced grain size responses. That is, I determined whether any of the factors (spontaneous or prompted) predicted participants behaviour when reporting information. To accommodate for participants providing two or more motivations that fit within one category, I created a measure of the extent to which each factor affected participants' responses. This measure was computed by calculating the mean of the ratings provided for all motivations within a factor. For example, a participant reported the film with a rating of seven on the influential rating scale, the questionnaire with a rating of six and the filler task with a rating of eight. All three responses fit within the task and stimuli category. Accordingly, I recorded that the participant reported task and stimuli as affecting their grain size responses at a mean level of seven on the nine-point influence scale. If a participant did not mention any task and stimuli motivations, no

task and stimuli score was recorded for that participant. The mean rating for the factors were used in all analyses.

Table 10

*Percentage and Number of Participants that Spontaneously Reported Each of the Motivational Factors*

| Factor | % | *N* |
|---|---|---|
| Memory | 78.48 | 62 |
| Task and stimuli | 54.43 | 43 |
| Guessing | 50.63 | 40 |
| Real Life | 50.63 | 40 |
| Participant factors | 41.77 | 33 |
| Confidence | 20.25 | 16 |
| Grain size | 16.46 | 13 |
| Accuracy | 12.66 | 10 |
| Other | 12.66 | 10 |
| Image | 10.13 | 8 |
| Audience | 5.06 | 4 |
| Informativeness | 2.53 | 2 |
| Privacy | 2.53 | 2 |
| Evaluation | 1.27 | 1 |

I investigated the effect of all 14 factors on responding, using simple regression. Mixed-effects modelling was not an appropriate analysis here as each participant had one data point for each factor.[11] I examined each factor using two regressions. I entered frequency of coarse-grain information withholding as the outcome in one regression and proportion of preferred responses that were fine-grain as the outcome in the second

[11] Participants only had a data point for a factor if they mentioned the factor. If they did not mention a factor, this factor was scored as missing.

regression. I entered the mean rating of the factor being investigated as the predictor in both regressions.[12] Results are presented in Table 11. Participants' ratings of informativeness significantly predicted their grain size choice. This result provides preliminary evidence that subjective ratings of, or perceived, informativeness may affect information reporting. Informativeness was the only factor found to significantly predict reporting. However, only 2.5% of participants spontaneously reported informativeness as motivating their responses. This indicates that participants were relatively unaware of the motivations guiding their decision to report or withhold information.

[12] With so many regressions, a statistically significant effect was potentially bound to come out. However, as these analyses were exploratory, I did not adjust the alpha levels.

Table 11

*Inferential and Descriptive Statistics from the Regression Investigating the Effects of the Fourteen Motivation Factors on Frequency of Coarse-Grain Withholding and Grain Size Choice*

| | | Regression outcome variable | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Frequency of withholding coarse-grain information | | | | | Proportion of preferred responses that were fine-grain | | | | |
| | Factors | $R^2$ | *F* | *p* | B | β | $R^2$ | *F* | *p* | B | β |
| Prompted | Accuracy | .01 | 0.65 | .424 | -.11 | -.09 | .02 | 1.52 | .221 | -.01 | -.14 |
| | Confidence | .03 | 2.20 | .142 | -.22 | -.17 | .01 | 0.88 | .351 | .01 | .11 |
| | Informativeness | .00 | 0.33 | .565 | -.07 | -.07 | .10 | 8.18 | .005 | .02 | .31 |
| | Evaluation | .01 | 0.76 | .387 | .09 | .10 | .01 | 0.60 | .442 | -.01 | -.09 |
| | Audience | .00 | 0.04 | .843 | .04 | .02 | .00 | 0.10 | .751 | -.00 | -.04 |
| | Privacy | .04 | 3.26 | .075 | -.16 | -.20 | .04 | 3.51 | .065 | .01 | .21 |
| Unprompted | Memory | .00 | 0.00 | .964 | .01 | .01 | -.02 | 1.14 | .290 | -.01 | -.13 |
| | Participant factors | .02 | 5.83 | .450 | -.18 | -.13 | .05 | 1.60 | .214 | .02 | .21 |
| | Image | .01 | 0.09 | .779 | .11 | .11 | .32 | 3.23 | .115 | -.04 | -.56 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Guessing | .00 | 0.10 | .921 | -.02 | -.02 | .00 | 0.13 | .718 | .01 | .06 |
| Real life | .13 | 2.36 | .144 | -.51 | -.36 | .00 | 0.01 | .911 | .00 | .03 |
| Task and stimuli | .01 | 0.24 | .625 | -.10 | -.07 | .00 | 0.00 | .996 | .00 | -.00 |
| Grain size | .06 | 0.79 | .390 | -.33 | -.24 | .01 | 0.19 | .674 | .01 | .12 |
| Other | .10 | 2.13 | .160 | -.35 | -.32 | .01 | 0.13 | .724 | .01 | .08 |

## Discussion

Study 1 results indicated that preference for fine-grain information was resistant to social context. The pervasiveness of this preference was tested further in Study 2. Here, I investigated whether this preference remained when fine-grain information was less adaptive. That is, I determined whether participants continued to prefer fine-grain information when coarse-grain information was the better option. I tested this by varying the lighting of the stimulus video viewed by participants. Specifically, I created a poor lighting condition in which it was difficult to discriminate fine-grain details but coarse-grain information could still be distinguished. In this condition, fine-grain information was less adaptive and coarse-grain information the more valuable and better option.

Consistent with Study 1 and other research (Ackerman & Goldsmith, 2008; Brewer et al., 2014; Yaniv & Foster, 1995), coarse-grain information was withheld in Study 2. Further, the preference for fine-grain information persisted, even when this information was less valuable than other information available. Additionally, participants were able to monitor their accuracy efficiently, suggesting that coarse-grain information was perhaps withheld because of ineffective control or poor decision making. Taken together, these results suggest that participants were actively making the decision to withhold coarse-grain information and this decision was made because they were motivated to be specific.

These findings have clear implications for the memory report theory and literature. First, these findings provide clear evidence of why coarse-grain information is withheld. They suggest that eyewitnesses sometimes withhold coarse-grain information from memory reports because they want to be informative. This corroborates Study 1 results and offers insight into why eyewitnesses behave this way.

Second, these findings demonstrate how pervasive the preference for fine-grain information is. The preference for specificity remained in Study 2, even when fine-grain information was not helpful. This provides additional insight into this bias, further demonstrating its strength and persistence. These findings also highlight how detrimental the preference for specificity could be. The preference for specificity is not always adaptive; it is not solely invoked in situations that require specificity. This bias remains even in situations when specificity is unnecessary or even detrimental. A pervasive preference for specificity, that is, a preference that is invoked regardless of whether it is helpful or applicable to the current situation, could negatively affect a police investigation. Fine-grain information is more likely to be incorrect compared to coarse-grain information (Yaniv & Foster, 1995). Therefore, over reporting fine-grain information may result in the volunteering of incorrect information which may mislead an investigation. Additionally, if inaccurate fine-grain information is volunteered at the expense of accurate coarse-grain information, valuable information that could benefit the investigation is lost. The pervasiveness of this fine-grain preference also demonstrates how difficult it may be to increase coarse-grain reporting. Coarse-grain reporting was not increased in Study 2, even when it was more valuable than the other information available. Accordingly, it may be difficult to reduce the effects of this bias both within a research setting and real life practice.

Third, Study 2 results confirm that motivation for informativeness may affect memory reporting by impacting the process of control. Like Study 1, this further highlights the boundary conditions of the monitoring and control model (Koriat & Goldsmith, 1996). When combined with Study 1 results, this finding provides compelling evidence that informativeness should be incorporated into Koriat and Goldsmith's (1996) monitoring and control model.

Study 2 confirmed that coarse-grain information is at times withheld from eyewitness memory reports because people are motivated to be informative and coarse-grain information is less informative than fine-grain information (Yaniv & Foster, 1995). Further, Study 2 discovered that the preference for fine-grain information is pervasive and can be maladaptive. As neither Studies 1 nor 2 were able to increase the reporting of coarse-grain information, I investigated perceptions of informativeness in Study 3. That is, I examined how participants perceived informativeness, expecting that this would provide insight into why people possess a preference for fine-grain information and why this bias is so pervasive and present even in situations where it is detrimental.

# CHAPTER 4

## Study 3: Measuring Perceptions of Informativeness

Studies 1 and 2 examined why eyewitnesses sometimes withhold coarse-grain information from their memory reports. Memory report literature suggests that eyewitnesses may withhold coarse-grain information because they are motivated to be informative; informativeness is operationalised in the literature as specificity (Goldsmith et al., 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995) and fine-grain information is more specific and thus informative than coarse-grain information (Yaniv & Foster, 1995). Study 1 investigated socially motivating conditions that may overcome fine-grain preference. However, the preference for specificity was resistant to social context and coarse-grain reporting was not increased. Accordingly, Study 2 tested whether fine-grain preference would remain even when fine-grain information was neither adaptive nor valuable. Again, coarse-grain reporting was not increased. Participants maintained their preference for specificity despite this preference being unnecessary, unhelpful and potentially maladaptive. Taken together, Study 1 and 2 findings suggest that people withhold coarse-grain information because they are motivated to be informative and this motivation persists even when it does not benefit the individual or their memory report.

Study 3 was conducted to gain insight into how participants conceptualise and perceive informativeness. I expected that any insight provided by Study 3 would increase understanding of fine-grain preference and coarse-grain withholding, potentially aiding reduction of this behaviour. Support for the investigation of perceived informativeness comes from both the literature and Study 2 findings. From the perspective of an eyewitness reporting information, there may be other dimensions to informativeness. Informativeness may incorporate subjective judgements and individual perceptions that vary across situations and individuals (Ackerman & Goldsmith, 2008).

What one person in one situation perceives as informative will differ from what is considered informative under alternative circumstances by another individual. Therefore, it may be subjective perceptions of informativeness that actually guides memory reporting. Additionally, in Study 2, I interviewed participants about the motivations that guided their responses on the grain size interview, identifying 14 factors that encapsulated participants' responses. Of these 14 factors, only one actually predicted participants' reporting behaviour. This factor was subjective ratings of informativeness which significantly predicted grain size choice. This provides preliminary evidence that individual perceptions of informativeness may impact memory reporting.

Before testing whether perceived informativeness affects coarse-grain withholding, I first needed to measure perceptions of informativeness. While perceived informativeness has not been measured within the memory reporting paradigm, measures of the construct exist in the crime victimization (Tyler & Rasinski, 1984), information appraisal (Teigen, 1985b), feedback (Swann Jr. & Read, 1981), attribution (Hilton & Slugoski, 1986) and social inference (Anderson & Ross, 1984) literatures. In all of the measures located, the focus was on one aspect of perceived informativeness, despite the literature suggesting that perceptions of informativeness consist of various judgements. All of the measures gauged how much the information told participants or how much participants learnt from the information. Essentially the measures assessed the amount of information conveyed which relates closely to the specificity conceptualisation of informativeness. All of these measures used a small number of items to assess perceived informativeness. Number of items ranged from one to three in all of the studies. Further, size of scales and anchors used understandably varied between studies. The studies conducted by Anderson and Ross (1984) and Tyler and Rasinski (1984) both failed to report the scale used and Swann Jr. and Read (1981) used

a six-point scale in their measure. With no neutral midpoint, participants may have randomly selected responses, affecting validity and potentially increasing random error in this study (Saris, 2007). Lastly, none of the studies reported any data pointing to the validity of their measure and only Tyler and Rasinski reported reliability data.

While these measures were suitable for the research aims of the individual studies, they were not suitable for my purposes. The review of these studies also highlighted that a comprehensive measure of perceived informativeness was lacking in the literature. To my knowledge, there are no measures of perceived informativeness that incorporate the various aspects of the construct, address the recommendations of the measure development literature, have been rigorously tested and present the reliability and validity of the measure.

To combat these shortcomings in the literature, I developed two measures of perceived informativeness in Study 3. These measures were designed to be completed by eyewitnesses after reporting each piece of information. The first measure was comprehensive and quite lengthy. Due to its length, this measure was suitable for use in situations where the perceived informativeness of a single piece of information was required. The extended perceived informativeness measure provided a basis for the development of a shorter, more concise version. The concise perceived informativeness measure was designed for use in situations where the perceived informativeness of several pieces of information was necessary. Both measures contained distinct subscales to reflect the individual components of the construct. I developed the measures in accordance with recommendations in the literature regarding scale size and anchor labels. Further, I rigorously tested the measures, determining their reliability and validity, before using the measures to answer any research questions (Study 4).

First, the various components of perceived informativeness in the literature were identified. As outlined previously, informativeness is primarily conceptualised in the

memory reporting literature as specificity (Brewer et al., 2014; Goldsmith et al., 2005; Yaniv & Foster, 1995). In addition, the literature suggests that perceptions of informativeness may include judgements of value and importance, interest, relevance, familiarity and image. Research indicates that judgements of value affect perceptions of informativeness, with trivial or unimportant information considered to be uninformative (Teigen, 1985a,1985b). Additionally, interesting information is considered to be more informative compared to uninteresting information (Teigen, 1985a). Research also indicates that the interaction between familiar and novel information affects perceptions of informativeness. Specifically, information is considered most informative if it provides new content about an already known topic (Teigen, 1985b). Relevance also affects perceptions of informativeness (Teigen, 1985b), with relevant information considered more informative than irrelevant information. Lastly, people are concerned with their image (Jones & Pittman, 1982) and desire to be seen positively (Leary, 1996). Accordingly, information may be perceived as informative if it in some way benefits the individual's image.

In addition to identifying the components of perceived informativeness, I also identified factors in the literature that may affect perceptions of informativeness. The literature suggests that audience and attentiveness may affect perceived informativeness. Participants must make judgements regarding whether their information is informative for the particular audience they are recollecting for (Hilton & Slugoski, 1986; Vandierendonck & Van Damme, 1988). This is an extension of familiarity and value. Participants must judge whether the information would be valuable for the audience and must assess how familiar the audience will likely be with the topic and content of their information. Attentiveness is related to audience in that people tend to convey more detailed information to attentive than inattentive listeners (Pasupathi, Stallworth, & Murdoch, 1998).

Finally, I also identified factors from the literature that had not been directly linked to perceived informativeness, but that I believed could affect perceptions of informativeness. Compliance, confidence and accuracy may affect perceived informativeness. People may comply with the anticipated perceptions of the audience. That is, an individual may perceive information to be informative if they believe that their audience holds this perception. Accuracy and informativeness are traditionally conceptualised as conflicting motivations (Yaniv & Foster, 1995). However, accuracy may reflect an aspect of informativeness. That is, an answer may be considered informative if it is both specific and correct. Confidence is related to accuracy in that a response may be perceived as informative if it is correct and people often make judgements of accuracy based on their gauged confidence in the information (Koriat & Goldsmith, 1996).

After identifying the components of perceived informativeness and the factors that may affect perceived informativeness, I composed items to assess each of these components and factors. Following this, I tested the measure. I showed participants the stimulus video, asked them to answer two questions regarding the video content and instructed them to rate their answers to these two questions on the series of perceived informativeness items I had developed. I then conducted analyses to eliminate unrelated and unnecessary items to form the comprehensive measure of perceived informativeness (the measure designed for use when perceptions of the informativeness of one piece of information are required). I then reduced this extended perceived informativeness measure to form the concise version of the instrument. This version was applicable when the perceived informativeness of a series of pieces of information was necessary, such as Studies 1 and 2. In such situations, a comprehensive measure would be too demanding on the individual's time and capacity to respond. I identified distinct

subscales within the measures and assessed the reliability and validity of both instruments.

## Method

### Participants

I recruited 150 participants (69 men, 77 women and 4 gender unreported) from the Flinders University campus, the School of Psychology online research participation system and the eyewitness laboratory email lists. Participants received payment or course credit for their involvement. The average age of participants was 27.1 years (*SD* = 9.8 years).

### Materials

**Stimulus video.** I used the ANZ mock bank robbery video from Study 1 and the 'light' condition of Study 2.

**Grain size questions.** While I did not measure coarse-grain withholding or grain size choice in Study 3, I needed participants to provide some grain size answers so that they had information for which they could rate informativeness. For this reason, participants answered two grain size questions. To ensure that perceived informativeness ratings were obtained across multiple stimuli (cf. Windschitl & Wells, 1996), so that the final measure would not simply reflect idiosyncratic responses to isolated questions, each participant received two from a pool of ten possible grain size questions. The combination of the questions received, and the order in which they were presented, was randomised. Across all participants, each question was answered 30 times, 15 times as the first question and 15 times as the second question. Each question was paired with every other question at least twice; with every question presented first at least once and second at least once. The ten questions were taken from the grain size interview used in Study 1. Five questions required numeric answers and five questions asked for colours seen in the film. Each question asked for a fine-grain answer and

confidence rating, as well as a coarse-grain answer and confidence rating. The order in which the grain size questions were posed was counterbalanced across the 10 questions. The confidence rating scales from Studies 1 and 2 were used in Study 3. Participants answered their two grain size questions in two phases. In phase one, participants were able to either provide answers and confidence ratings or circle the "don't know" option (free report). In phase two participants had to provide an answer for any question to which they initially responded "don't know" (forced report).

**Perceived informativeness measures.** I identified 11 factors in the literature that were either components of perceived informativeness or factors thought to affect perceived informativeness (specificity, value, accuracy, familiarity, audience, image, confidence, compliance, attentiveness, interest and relevance). After identifying these factors, I composed a series of 29 items, each aimed at one of the 11 factors. See Table 12 for a list of the items, separated into the aspects of perceived informativeness they were assessing. Between one and four items were aimed at each of the factors. Within each factor, approximately half of the items ($N$=15) were positively phrased (e.g., "When deciding whether I would report the general answer I thought that the information would be useful for the police interviewer"). The other items ($N$=14) were negatively phrased (e.g., "When deciding whether I would report the general answer I thought that the information would be unhelpful for the police interviewer"). All negatively worded items were reverse scored. I used negative wording to prevent acquiescence (Clarke, Kornberg, & Scotto, 2010; Holden, Fekken, & Jackson, 1985).

Each of the 29 items was presented twice; once for the coarse-grain answer and once for the fine-grain answer (e.g., "When deciding whether I would report the *general* answer I thought that the information would be inaccurate for the police interviewer" and "When deciding whether I would report the *specific* answer I thought that the information would be inaccurate for the police interviewer"). Although I developed this

measure to determine whether perceived informativeness predicted coarse-grain information withholding, it was important that a comparison was made with fine-grain information so that discriminant validity could be established. If the questionnaire did, as intended, measure perceived informativeness; fine-grain information should have been rated as significantly more informative than coarse-grain information. The order of all items was randomised. That is, items were not separated by grain size or perceived informativeness components. All participants received the same order of questions.

I phrased all items in terms of perceptions (e.g., "When deciding whether I would report the general answer I *thought* that the information would…") rather than reasons (such as "I withheld the general answer because…"). Study 2 interview results suggest that people may not always be aware of the reasons underlying their behaviours and decisions. As a result, 'perception' items may be more sensitive and better able to extract motivations compared to 'reason' items. In addition, participants could use 'reason' items to retrospectively justify their choices.

Items also reflected the decision making process regarding what information would be volunteered, (the "when deciding whether I would report" aspect of the examples above) rather than the final choice to volunteer or withhold answers. This allowed participants to complete one perceived informativeness measure regardless of their reporting decision, rather than having to complete one measure if they withheld the information and a different measure if the information was volunteered.

Participants responded to each item using a seven-point likert scale. Scales of this size allow greater differentiation between responses compared to smaller scales (Alwin, 1992) without artificially inflating differentiation as can occur with larger scales (Cox, 1980). The seven-point scale also has a neutral middle point which prevents uncertain participants from randomly selecting other response options. Randomly selecting other responses can lower validity and increase random error (Saris, 2007). The scale used

was unipolar with matching verbal anchors (Lietz, 2010); “completely disagree” and “completely agree” (Oppenheim, 1992). The disagree option had a lower numeric value attached than the agree anchor (Lietz, 2010) so that higher scores on the measure were indicative of greater levels of perceived informativeness (Oppenheim, 1992).

Table 12

*Perceived Informativeness Components and Items*

| Component | Items |
|---|---|
| Specificity | When deciding whether I would report the answer to the police interviewer I thought that this information would be **too general to be useful.*** |
| | When deciding whether I would report the answer I thought that the information would still be seen as **detailed** by the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would be too **vague** for the police interviewer.* |
| | When deciding whether I would report the answer to the police interviewer I thought that the information would still be seen as **precise**. |
| Value | When deciding whether I would report the answer I thought that this information would be **unhelpful** for the police interviewer.* |
| | When deciding whether I would report the answer I thought that the information would seem **unimportant** to the police interviewer.* |
| | When deciding whether I would report the answer I thought that the information would be **useful** for the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would seem **valuable** by the police interviewer. |
| Accuracy | When deciding whether I would report the answer I thought that this information would be seen as **correct** by the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would be seen as **inaccurate** by the police interviewer.* |
| | When deciding whether I would report the answer to the police interviewer I thought that the information would be **wrong**.* |
| | When deciding whether I would report the answer I thought that the |

| | |
|---|---|
| | information would seem like it was **true** for the police interviewer. |
| Familiarity | When deciding whether I would report the answer I thought that the information would be **new** to the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would **already be known** by the police interviewer.* |
| Audience | When deciding whether I would report the answer I thought that the information would **add** to the police interviewer's **knowledge**. |
| | When deciding whether I would report the answer I thought that the information would be **beneficial** for the police interviewer. |
| | When deciding whether I would report the answer I thought that the police interviewer would think that response was **worthless**.* |
| Image | When deciding whether I would report the answer to the police interviewer I thought that the information would make me look **incompetent**.* |
| | When deciding whether I would report the answer I thought that the information would make me look **unintelligent** to the police interviewer.* |
| | When deciding whether I would report the answer I thought that the information would make me look **co-operative** to the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would make me look **observant** to the police interviewer. |
| Confidence | When deciding whether I would report the answer I thought I would appear **confident** to the police interviewer. |
| | When deciding whether I would report the answer I thought that the information would make me appear **uncertain** to the police interviewer.* |
| Compliance | When deciding whether I would report the answer for the police interviewer I felt like I was being **noncompliant**.* |
| | When deciding whether I would report the answer I felt like I would be just **conforming** to what the police interviewer would want. |
| Attentiveness | When deciding whether I would report the answer I was concerned that the police interviewer who would read my answers would **not pay attention** to it.* |
| Interest | When deciding whether I would report the answer I thought that the information would be **uninteresting** for the police interviewer.* |
| | When deciding whether I would report the answer I thought that the |

| | |
|---|---|
| | information would be **fascinating** for the police interviewer. |
| Relevance | When deciding whether I would report the answer to the police interviewer I thought that this information would be seen as **relevant**. |

* Reverse scored items

Prior to responding to the perceived informativeness items, participants were presented with a scenario. Participants were told to imagine that they were a real eyewitness who observed a real bank robbery occur and that they were providing information about the crime to a real police investigator. Participants were told to answer the perceived informativeness items with this scenario in mind. In addition, all items were worded to include the police investigator to ensure that participants were mindful of the instructions throughout the session. I used this scenario, rather than simply asking participants to report this information to a researcher. The information provided would not be informative to a researcher who presumably knows the correct answers. In contrast, a police interviewer would not know this information, hopefully providing for more variance in the perceived informativeness ratings.

Participants completed the perceived informativeness measure after the second phase of each grain size question. The measure was completed after each question to ensure that motivations were recorded immediately, at the time of withholding. I could have administered the perceived informativeness measure after both grain size questions were completed, however, this would have involved participants making retrospective judgements about why they may not have volunteered the information and may have caused confusion about which grain size answer was being rated.

**Procedure**

I provided participants with verbal instructions outlining how the session would proceed before assigning them to one of the laboratory cubicles. Participants read the introduction letter, completed the consent form and watched the stimulus video.

Participants then completed the word search distracter task used in Study 2, for two minutes. Once the two minutes elapsed, participants received the phase one (free-report) instruction booklet and the first of their two grain size questions. Consistent with Study 2, participants were provided with a "don't know" option in phase one. Participants were advised that if they did not want to provide an answer they should circle the "don't know" option. Participants were not given specific encouragement to use this option. Phase one was completed using a black pen. Following this, I distributed phase two (forced-report) instructions and swapped the black pen for a red one. In this phase participants were required to go back through their answers and provide a response if they responded "don't know" during phase one. Use of different coloured ink allowed me to distinguish between phase one and phase two answers. Following this, participants received the perceived informativeness measure and their black pen was returned. As outlined above, the perceived informativeness measure contained 58 statements (29 statements for each of the two information types). Participants rated their agreement with each of the statements using the rating scales provided. Upon completion of the perceived informativeness measure, I informed participants that the process would be repeated with a second question about the video content. I returned the phase one (free-report) instructions to the participant and distributed their second grain size question. Participants answered this question under free report. Upon completion of this, I distributed the phase two (forced-report) instructions. Participants answered the question under forced report before completing the perceived informativeness measure again. Finally, participants were thanked, debriefed and financially reimbursed or allocated course credit for their contribution.

## Results

Study 3 developed two measures of perceived informativeness. The first measure was longer, more comprehensive and was designed for use in a situation where the

perceived informativeness of a single piece of information needed to be rated. The second measure was more concise. This measure was designed for use when the perceived informativeness of multiple pieces of information required rating.

Participants made 116 ratings, 29 for each of the two coarse and fine-grain questions. I analysed these 116 ratings together and also investigated question and grain size separately. That is, I conducted one analysis to investigate responses to both fine and coarse-grain answers across the two items together, one analysis for participants' ratings of the perceived informativeness of their first coarse-grain answer, one analysis for responses to their second coarse-grain answer, one analysis investigating their first fine-grain answer and, finally, a separate analysis to examine their second fine-grain answer. I report results from these four separate analyses when developing the measures and identifying the subscales. I reported results from the separate analyses to ensure that the final measures reflected any differences in ratings of perceived informativeness of fine and coarse-grain responses, order effects and responses to different grain size items. In contrast, for reliability and validity, I report results after analysing all responses together. However results from reliability and validity analyses investigating items and grain sizes separately can be viewed in Appendices C, D, F and G.

**Extended Perceived Informativeness Measure**

I first focused on the extended perceived informativeness measure. This was the longer and more comprehensive measure, designed for situations where the perceived informativeness of a single piece of information needed to be gauged. I conducted analyses to discard unnecessary and inconsistent items. I then identified subscales within this measure. Finally, I established whether the measure was reliable and valid.

**Discarding inconsistent and unnecessary items.** It was important that the measure of perceived informativeness contained only items that measured the construct of interest. For logistical reasons, I also wanted to ensure that all of the items in the final

measure were crucial and not unnecessary. First, to ensure that all items in the final measure were assessing perceived informativeness, I identified which of the 29 items were inconsistent with the other items. I identified these items as they were not measuring the same construct as the majority of the questions, and could be removed. I conducted this analysis separately for item and grain size. I entered all 29 items into the four reliability analyses. Within each reliability analysis, I continued to remove items until the highest possible Cronbach's alpha ($\alpha$) was reached. I recorded the factors that were removed from each of the four analyses. Any item that was removed from all four analyses was eliminated from the measure. I eliminated three items; conforming, cooperative and non-compliant. Table 13 presents the initial $\alpha$ before any items were removed, the highest possible $\alpha$, the items that were removed to achieve the highest possible $\alpha$ and the final $\alpha$ after the conforming, cooperative and non-compliant items were removed, for each reliability analysis.

Table 13

*Items, and Associated α, Deemed Least Consistent With the Perceived Informativeness Measure by Each of the Four Reliability Analyses*

| | Reliability analysis | | | |
|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question two coarse-grain | Question two fine-grain |
| Initial $\alpha$ | .89 (29 items) | .88 (29 items) | .92 (29 items) | .93 (29 items) |
| Highest $\alpha$ | .92 (17 items) | .89 (26 items) | .94 (24 items) | .94 (24 items) |
| Items removed to achieve highest $\alpha$ | Too general<br>Correct<br>New<br>Wrong<br>Conforming<br>Fascinating<br>Cooperative<br>True<br>Confident<br>Precise<br>Non-compliant<br>Observant | Conforming<br>Non-compliant<br>Cooperative | Correct<br>Conforming<br>Cooperative<br>Non-compliant<br>True | Conforming<br>Cooperative<br>Fascinating<br>Already known<br>Non-compliant |
| Final $\alpha$ | .90 (26 items) | .89 (26 items) | .94 (26 items) | .94 (26 items) |

Second, for practicality, I identified and removed items that were unnecessary. Specifically, I identified and removed items that were strongly correlated with other items. While strong correlation between items generally improves reliability, I sought to develop a measure that was practical to administer. For this reason, I was willing to accept slight, and virtually unrecognisable, decreases in reliability, for the practicality of a measure with fewer items. As discussed in detail below, I identified four subscales within the perceived informativeness measure. One of these subscales, value, consisted of 11 items. This subscale was much larger than the others. The high $\alpha$ for this subscale

indicated that the 11 items were reliably measuring the same construct. Removing some of the value items would increase the conciseness of the measure and subscale without severely undermining reliability. I sought to reduce the value subscale by approximately four items so that it would be similar in size to the next largest subscale, image. I conducted a series of five reliability analyses to ascertain which value items should be removed. Four reliability analyses investigated grain size and item separately and one analysis investigated all items together.

I entered the 11 value items into each of the five reliability analyses. For each of the analyses, I recorded which four items contained the highest '$\alpha$ if deleted' coefficient. This coefficient reflected the items that were least crucial to the reliability of the subscale. The items that all five reliability analyses indicated were least crucial were eliminated from the value subscale and the perceived informativeness measure. I removed the new, already known and not paying attention items. For each analysis, Table 14 presents the initial $\alpha$ for the value subscale prior to any items being removed, lists the four items with the highest '$\alpha$ if deleted' value and states the final $\alpha$ after the new, already known and not paying attention items were removed from the subscale.

Through the two methods outlined above, I removed six items from the perceived informativeness measure, leaving a final 23 item questionnaire. The final 23 items are listed in Table 15.

**Identifying subscales.** After establishing a final measure of perceived informativeness, I examined whether subscales existed within the measure, investigated what the subscales were and ascertained what items were included within each subscale. I investigated subscales using both exploratory and confirmatory analytic techniques. Principle components analysis (PCA) was the exploratory analysis used. I tentatively[13] used PCA to determine which items grouped together as subscales within the perceived

[13] I only used PCA tentatively as my sample size was smaller than recommended (Tabachnick & Fidell, 2013).

informativeness measure. I conducted four PCAs to investigate grain size and item separately. Prior to conducting the PCAs, I assessed the suitability of the data for factor analysis. Data met the criteria in all four PCAs; many correlations of .3 or above were identified, the Kaiser-Meyer-Oklin value exceeded the recommended value of .6 (Kaiser, 1974) and the Bartlett's Test of Sphericity was statistically significant. Inspection of the eigenvalues and screeplots across the PCAs suggested the presence of three factors or subscales.[14]

Table 14

*Items, and Associated α, Deemed Least Crucial to the Value Subscale by Each of the Five Reliability Analyses*

| | Reliability analysis | | | | |
|---|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question two coarse-grain | Question two fine-grain | Total |
| Initial $\alpha$ | .89 (11 items) | .87 (11 items) | .91 (11 items) | .89 (11 items) | .95 (44 items) |
| Highest $\alpha$ if deleted | Unhelpful<br>New<br>Already Known<br>Not paying attention | Add knowledge<br>New<br>Not paying attention<br>Already known | New<br>Already Known<br>Not paying attention<br>Add knowledge | New<br>Not paying attention<br>Worthless<br>Already known | New<br>Useful<br>Add knowledge<br>Already known<br>Not paying attention |
| Final $\alpha$ | .91 (8 items) | . 88 (8 items) | .92 (8 items) | .91 (8 items) | .95 (32 items) |

I performed a varimax rotation in all four PCAs to aid interpretation of the factors. Items were considered to be loaded onto a factor when the item's rotated factor loading

[14] The percentage variance explained by each component in each of the PCAs is listed in Appendix E.

exceeded .4. In some cases one item loaded onto multiple factors.[15] PCAs group items together to form factors but do not interpret the factors. I interpreted the factors in conjunction with the perceived informativeness literature. Factor one was largely value based, factor two predominantly image based and factor three contained both specificity and accuracy elements. Again it must be noted, that this form of analysis was exploratory and must be interpreted with caution due to the sample size.

I used reliability analyses to confirm the subscales loosely outlined in the PCAs. I used a trial and error approach based on the results of the PCAs and the components of perceived informativeness outlined in the literature (see Table 12). I conducted a series of reliability analyses to ascertain which items grouped together as subscales. I continued to adjust the subscales until all items were in a subscale. Table 15 lists the subscales and their items.

Table 15

*Perceived Informativeness Items Separated Into Subscales*

| | Subscales | | | |
|---|---|---|---|---|
| | Value | Image | Specificity | Accuracy |
| Items | Unimportant | Unintelligent | Vague | Correct |
| | Worthless | Incompetent | Too general | True |
| | Valuable | Fascinating | Detailed | Inaccurate |
| | Unhelpful | Confident | Precise | Wrong |
| | Beneficial | Observant | | |
| | Useful | Uninteresting | | |
| | Relevant | Uncertain | | |
| | Add knowledge | | | |

**Reliability.** Once I had removed items to form a perceived informativeness measure and had established subscales within this measure, I determined whether the measure

[15] Appendix E presents the components that emerged from the various PCAs conducted and lists the items that loaded onto each component.

and its subscales were reliable. That is, I ascertained whether items were assessing the same construct. Reliability analysis results indicated that the total extensive perceived informativeness measure was internally consistent ($\alpha$ = .96) as were each of its subscales (see Table 16 for statistics). This suggests that all items together were measuring the same construct and that the items within each subscale were measuring the same component of the construct.

Table 16

*Reliability of Extended Perceived Informativeness Measure Subscales*

| | Subscales | | | |
|---|---|---|---|---|
| | Value | Image | Specificity | Accuracy |
| $\alpha$ | .95 | .83 | .74 | .79 |

**Validity.** In addition to determining reliability of the extended perceived informativeness measure, I also investigated discriminant validity. That is, in addition to determining that the items were measuring the same construct, I also wanted to ensure that this construct was perceived informativeness. The memory reporting literature suggests that fine-grain information is more informative than coarse-grain information (Yaniv & Foster, 1995). Accordingly, if this measure was successfully assessing perceived informativeness, participants should rate their fine-grain answers as more informative than their coarse-grain answers. I examined discriminant validity for both the entire extensive perceived informativeness measure as well as its subscales. When focusing on the entire measure, I calculated a total fine-grain score and coarse-grain score for every participant and conducted a paired samples *t* test to investigate whether there was a significant difference between the two scores. Results indicated that the mean fine-grain score ($M$ = 231.76, $SD$ = 36.15) was significantly higher than the mean

coarse-grain score [$M$ = 208.61, $SD$ = 40.51, $t(142) = 6.89$, $p < .001$, $d$ = 0.60, $d$ 95% CI [0.36, 0.84]], confirming that participants rated their fine-grain answers as more informative than their coarse-grain answers. This provided some evidence that the extensive measure developed was indeed measuring perceived informativeness.

I assumed this same process when determining the discriminant validity of the individual subscales. For each subscale, I calculated a total fine-grain and coarse-grain score for each participant and compared these scores using a paired samples $t$ test. I expected that the subscale items would assess a component of perceived informativeness. If the items within a subscale were indeed assessing a component of perceived informativeness, fine-grain scores would be significantly higher than coarse-grain scores. Table 17 presents results for each of the subscales. The value, image and specificity subscales were all valid as fine-grain answers were rated as significantly more informative than coarse-grain answers. This indicates that these three subscales were measuring three components of perceived informativeness. In contrast, the fine and coarse-grain scores did not significantly differ for the accuracy subscale. This indicates that the accuracy subscale was not valid and that perhaps the items within this subscale were not measuring a component of perceived informativeness.

Table 17

*Discriminant Validity of Extended Perceived Informativeness Measure Subscales*

| | Fine-grain | Coarse-grain | | | | |
|---|---|---|---|---|---|---|
| Subscale | *M* *(SD)* | *M* *(SD)* | *t* | *p* | *d* | *d* 95% CI |
| Value | 86.42 (16.12) | 77.90 (18.74) | 6.44 | < .001 | 0.48 | [0.25, 0.72] |
| Image | 68.71 (10.41) | 61.50 (12.53) | 6.74 | < .001 | 0.62 | [0.39, 0.86] |
| Specificity | 39.97 (7.90) | 31.80 (7.90) | 9.92 | < .001 | 1.03 | [0.78, 1.27] |
| Accuracy | 36.31 (7.44) | 37.05 (7.05) | -1.25 | .213 | -0.10 | [-0.33, 0.13] |

**Concise Perceived Informativeness Measure**

The extended version of the perceived informativeness measure was comprehensive. It was both reliable and valid and assessed multiple components of perceived informativeness. This measure was reasonably long though, containing 29 items. While this measure was suitable if completed once or possible twice, it would not be practical in a situation when an eyewitness was required to rate the perceived informativeness of many pieces of information. To combat this, I used the long form of the instrument to develop a second version of the perceived informativeness measure. The second version was much shorter than the first and practical for use in situations where the perceived informativeness of a series of responses needed to be assessed. That is, I created a version of the perceived informativeness measure that contained fewer items so that it could be completed multiple times within one interview session.

**Identifying optimal items.** When developing the extended version of the measure, I eliminated unrelated and unnecessary items. However, when developing the concise

version of the measure, I identified the strongest and best items from the extended measure's reliable and valid subscales. All four subscales of the extended version were reliable, but, the accuracy subscale was not valid. Accordingly, I eliminated the accuracy items from the concise measure and conducted a series of analyses to establish what the strongest value, image and specificity items were. Once I had identified the strongest questions, I removed all other items before testing the reliability and validity of the concise perceived informativeness measure and its subscales.

I conducted a series of reliability analyses to determine the most crucial items within the value, image and specificity subscales. I conducted five reliability analyses for each of the three subscales. Within each reliability analysis I recorded the items with the lowest '$\alpha$ if deleted' value. These items reflected the most crucial items in the subscale and, consequently, the items that should be retained. For each subscale, I selected the two items that were listed as most crucial in the greatest proportion of reliability analyses. For each subscale, Table 18 depicts the items with the lowest '$\alpha$ if deleted' values, across the five analyses. The final concise perceived informativeness measure contained six items. These six items separated into value, image and specificity subscales. The valuable item and useful item were retained under the value subscale. The uninteresting and uncertain items comprised the image subscale. Lastly, the specificity subscale consisted of the vague and precise items.

**Reliability.** Once I had developed a concise version of the perceived informativeness measure, I ascertained whether this measure and its subscales were reliable. I conducted one reliability analysis to investigate the internal consistency of the total, six item, perceived informativeness measure and several additional reliability analyses to ascertain the internal consistency of the measure's three subscales. The total concise measure was internally consistent ($\alpha$ = .87), as were the value ($\alpha$ = .84) and image subscales ($\alpha$ = .76). The specificity subscale was below the suggested .7

reliability cut off (Pallant, 2005), ($\alpha$ = .57). This suggests that the specificity items were perhaps not measuring the same aspect of the construct. This was not surprising, however, as the subscale contained only two items.

Table 18

*Items with the Lowest 'α if Deleted' Values by Reliability Analysis for each Subscale*

| | Subscale | | |
|---|---|---|---|
| Reliability Analysis | Value | Image | Specificity |
| Total | Valuable | Uninteresting | Too general |
| | Unimportant | Uncertain | Vague |
| | Worthless | | Precise |
| | Unhelpful | | |
| | Beneficial | | |
| | Useful | | |
| | Relevant | | |
| Q1CG | Useful | Unintelligent | Vague |
| | Valuable | Uninteresting | Detailed |
| | Unimportant | | |
| Q2CG | Valuable | Uninteresting | Vague |
| | Useful | Uncertain | Precise |
| Q1FG | Valuable | Incompetent | Precise |
| | Beneficial | Confident | Too general |
| Q2FG | Relevant | Confident | Detailed |
| | Valuable | Uncertain | Vague |

**Validity.** In addition to calculating the reliability of the concise perceived informativeness measure, I also ascertained whether it was valid. Specifically, I conducted discriminant validity analyses for the total, six item, perceived informativeness measure as well as for each of the three subscales. Consistent with the extended measure analysis, for each participant, I calculated a total fine-grain score and

coarse-grain score overall as well as for each subscale. I then used paired samples *t* tests to determine whether there was a significant difference between the fine and coarse-grain scores for each subscale and the overall measure. I expected that the measure and subscales would be valid. That is, I expected that ratings of perceived informativeness would be significantly higher for fine-grain answers compared to coarse-grain answers. Results were consistent with this hypothesis and indicated that mean fine-grain scores were significantly higher than mean coarse-grain scores for the overall, concise, measure of perceived informativeness as well as its three subscales. Table 19 presents the descriptive and inferential statistics. These results confirm that participants perceived their fine-grain answers to be more informative than their coarse-grain answers, suggesting that the concise measure and its subscales are valid and thus measuring perceived informativeness and its various components.

Table 19

*Discriminant Validity of the Concise Perceived Informativeness Measure and Each of its Subscales*

| | Fine-grain | Coarse-grain | | | | |
|---|---|---|---|---|---|---|
| Measure | *M* *(SD)* | *M* *(SD)* | *t* | *p* | *d* | *d* 95% CI |
| Total perceived informativeness | 61.31 (10.28) | 53.48 (12.91) | 7.42 | <.001 | 0.67 | [0.43, 0.90] |
| Value subscale | 21.19 (4.63) | 19.07 (5.33) | 5.01 | <.001 | 0.42 | [0.19, 0.65] |
| Image subscale | 20.69 (4.10) | 18.73 (5.21) | 5.25 | <.001 | 0.41 | [0.18, 0.64] |
| Specificity subscale | 19.47 (4.09) | 15.73 (4.47) | 8.55 | <.001 | 0.87 | [0.63, 1.11] |

## Discussion

Study 3 developed two measures of perceived informativeness. The first was a 23-item, comprehensive version of the measure. It contained four distinct subscales: value, image, specificity, and accuracy, each assessing a different aspect of perceived informativeness. The total measure and three of the four subscales were both reliable and valid. The fourth subscale, accuracy, was reliable but not valid. I developed the comprehensive version for use in situations where the perceived informativeness of one piece of information needs to be determined. I then reduced the extended instrument to form a concise perceived informativeness measure, containing just six items. This version consisted of three subscales: value, image, and specificity. Each subscale contained two items. The concise version of the measure and two of its three subscales were both reliable and valid. The specificity subscale was valid but not reliable. I developed the concise version of the measure for use in situations when the perceived informativeness of a series of pieces of information must be ascertained.

The measures of perceived informativeness developed in Study 3, are, to my knowledge, the first to comprehensively assess the multiple dimensions of perceived informativeness. Further, these were the first measures of perceived informativeness to be tested, and reliability and validity established, before being used to answer any research questions. Perceived informativeness has been measured in several different areas of psychology. While I only have validity data for these measures within the eyewitness memory report paradigm, future research could test and potentially use these measures in other fields.

While the measures of perceived informativeness could be applied to other fields, I developed these instruments for use in subsequent eyewitness reporting studies. Studies 1 and 2 were unable to increase reporting of coarse-grain information. Accordingly, Study 3 was conducted to investigate participants' perceptions of informativeness under

the expectation that this would provide insight into the bias towards fine-grain information. Results indicated that in addition to specificity, perceptions of informativeness also include judgements of value and image. The concise measure of perceived informativeness developed in Study 3 was used in Study 4 to determine whether these perceptions of informativeness affect memory reporting and to ascertain whether coarse-grain reporting can be improved.

# CHAPTER 5

## Study 4: The Effect of Perceived Informativeness on Memory Reporting

The memory report literature proposes that coarse-grain information may be withheld because people are motivated to be informative (Yaniv & Foster, 1995). Study 1 investigated whether motivation for informativeness could be overcome under certain social conditions and Study 2 determined whether this motivation would remain when fine-grain information was not adaptive. Results indicated that participants withheld coarse-grain information because they were biased towards reporting fine-grain information and were motivated to be informative. Further, motivation for informativeness was resistant to social context and remained even when not adaptive. However, from the perspective of an eyewitness, although the desire to provide informative reports may be crucial, what constitutes informative may be somewhat more complex than the literature's current conceptualisation. Informativeness may incorporate both subjective judgements and individual perceptions (Ackerman & Goldsmith, 2008). Thus, subjective or perceived informativeness may be the key influence on what eyewitnesses report.

The suggestion here is that perceived informativeness may have an effect on the monitoring and control framework over and above the influence of confidence. In addition to determining their confidence and accuracy in the retrieved information, eyewitnesses may also determine how informative they perceive the information to be. Eyewitnesses may be confident in the retrieved information and believe that it is likely to be correct but may also perceive the information to be uninformative. They may deem the information to be valueless and non-specific, and may believe that volunteering the information would adversely affect their image. For these reasons, the eyewitness may decide to withhold the information from their memory report. In this

situation, perceived informativeness has affected decision making and the process of control and led to the withholding of coarse-grain information.

To ascertain whether perceived informativeness predicted the withholding of coarse-grain information, a measure of perceived informativeness was required. As an appropriate measure was not available in the literature, I developed a concise, valid and reliable measure of perceived informativeness in Study 3. The measure contained six items which separated evenly into three subscales: value, image and specificity. The subscales each assessed a different component of perceived informativeness. I used this measure in the current study to ascertain whether perceived informativeness, and its individual components, predicted the withholding of coarse-grain information and grain size choice. I measured coarse-grain withholding using Study 2's method and grain size choice and confidence using Study 1 and 2 protocol.

I predicted that perceived informativeness would affect coarse-grain withholding and grain size choice differently. I hypothesised, that participants would be more likely to withhold coarse-grain information when they perceived this information to be uninformative (when ratings of perceived informativeness of coarse-grain information were low compared to high). But I also predicted that perceived informativeness of fine-grain information would drive, and predict, grain size choice. In particular, I hypothesised that participants would be more likely to select their fine-grain answer as their preferred response when they perceived the fine-grain information to be informative (when ratings of perceived informativeness of fine-grain information were high compared to low).

Finally, I expected that the monitoring process and confidence mechanism of the monitoring and control model would not be responsible for the withholding of coarse-grain information. That is, I predicted that confidence would significantly predict information reporting and the accuracy of the reported information.

## Method

### Participants

I recruited 140 (38 men, 99 women and 3 gender unreported) participants from the Flinders University campus, the School of Psychology research participation system and the eyewitness laboratory email list. Average age of participants was 22.8 years (*SD* = 6.7). Participants were financially reimbursed or allocated course credit for their involvement.

### Materials

**Stimulus video.** I used the ANZ mock bank robbery video from Study 1, Study 2 (light condition) and Study 3.

**Grain size questionnaire.** The 10 grain size questions from Study 3 were used. Five questions required numeric responses and five asked for colours seen in the film. Participants answered all 10 questions. Half of the participants answered questions one to five followed by six to ten. The remaining participants answered items six to ten followed by one to five. Consistent with previous studies, participants were asked to provide a fine-grain answer and confidence rating as well as a coarse-grain answer and confidence rating, for every question. The order in which these grain size questions were posed was counterbalanced. I used the confidence scales used in Studies 1-3. Consistent with Study 2, participants completed the grain size questionnaire in three phases. In phase one, participants answered the grain size questions under free-report instructions. Participants were able to either provide an answer and confidence rating or circle the “don’t know” option available. In phase two, participants completed the same questionnaire under forced-report instructions. In this phase participants were asked to provide an answer for any question to which they initially responded “don’t know”. Finally, in phase three, I removed confidence ratings and participants selected a final preferred response for every question.

**Perceived informativeness measure.** The six item measure of perceived informativeness developed was used as the perceived informativeness measure in Study 4 rather than the extended version, as participants rated the perceived informativeness of 10 different pieces of information. The extended version would not have been practical to administer in this situation. Three distinct subscales were identified within the measure: value, image and specificity.

Participants received the same written scenario, items and response scale used in Study 3. Consistent with Study 3, each item was presented twice, once in reference to participants' coarse-grain answer and once for their fine-grain response. Items were presented in a random order. All participants received the same order of items.

Participants completed the perceived informativeness measure in a separate booklet during phase two of the grain size interview. Combining the perceived informativeness measure with phase two of the grain size questionnaire ensured that perceptions of informativeness were recorded immediately. A separate booklet was used to ensure that the perceived informativeness ratings did not interfere with the decision to volunteer or withhold information in phase one.

**Procedure**

Participants received verbal instructions outlining how the session would proceed before reading the introduction letter, completing the consent form and watching the stimulus video in their laboratory cubicle. Participants completed the same distracter task used in Studies 2 and 3, before receiving the phase one (free-report) instruction booklet and the first grain size interview booklet. The first grain size booklet contained five of the ten questions. The questions received in the first booklet were dependent on the condition to which participants were randomly assigned. Participants commenced phase one (free report) of the grain size questionnaire using a black pen. In phase one, participants were able to provide answers or circle the "don't know" option available.

Specific encouragement to use this option was not provided. Participants then completed the second grain size interview booklet under the same, phase one (free-report), instructions. This booklet contained the remaining five grain size questions. Upon completion, participants received the phase two (forced-report) instructions and the first perceived informativeness booklet. The first grain size interview booklet was also returned. I removed black pens and distributed blue ones. In phase two, participants answered question one of the grain size interview under forced-report instructions. That is, participants provided an answer if they originally responded "don't know" to this question. Participants then referred to question one in the perceived informativeness booklet and rated their question one grain size answers on the 12 perceived informativeness items (six items for each of their fine and coarse-grain responses) using the rating scales provided. Participants repeated this process for the other four questions in the first grain size interview and perceived informativeness booklets. Upon completion, I gave participants a five minute break and offered them a small chocolate. After their break, participants completed the second grain size and perceived informativeness booklets using the same procedure. Following this, I removed participants' confidence ratings and distributed phase three (preferred response) instructions. Phase three was completed using a red pen. Use of different coloured ink allowed me to establish which answers were volunteered during the various phases. Removing confidence ratings prior to the commencement of phase three ensured that phase three choices were not guided by confidence ratings. Finally, participants were thanked, debriefed and financially reimbursed for their time or allocated course credit.

## Results

Eighteen (1.29%) answers were excluded as the fine-grain answer was correct and the coarse-grain answer incorrect. I reverse scored negatively worded perceived informativeness items so that higher scores represented greater perceived

informativeness. I calculated perceived informativeness separately for coarse and fine-grain information so that I could test whether perceived informativeness of coarse-grain information was driving coarse-grain withholding and perceived informativeness of fine-grain information was driving grain size choice.

**Withholding of Coarse-Grain Information**

Participants withheld 127 (9.07%) coarse-grain answers in Study 4. I tested whether perceived informativeness, and the various components of the construct, predicted this withholding of coarse-grain information using four logistic mixed-effects models. The first model investigated whether perceived informativeness predicted withholding and the additional models assessed whether the distinct components of perceived informativeness (subscales) predicted this behaviour. Consistent with Study 2, I focused on coarse-grain withholding when fine-grain information could not be retrieved. Accordingly, only instances when fine-grain information was withheld, were included in the models.

Through the first model, where total perceived informativeness was investigated, I determined whether perceived informativeness of coarse-grain information predicted coarse-grain withholding over and above the influence of confidence in coarse-grain information. I also ascertained whether perceived informativeness of fine-grain information added to this effect. I entered coarse-grain withholding as the dependent variable with coarse-grain information considered withheld if it was volunteered under forced report but not free report. I entered confidence in coarse-grain information as the first predictor, perceived informativeness of coarse-grain information as the second predictor and perceived informativeness of fine-grain information as the third predictor. See Table 20 for model fit statistics and Table 21 for fixed effect coefficients.

Table 20

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Ratings of Perceived Informativeness Affected the Withholding of Coarse-Grain Information*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in coarse-grain information | 120.20 | 1 | <.001 |
| Perceived informativeness of coarse-grain information | 6.32 | 1 | .012 |
| Perceived informativeness of fine-grain information | 1.83 | 1 | .176 |

Table 21

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Ratings of Perceived Informativeness Affected the Withholding of Coarse-Grain Information*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 2.85 | .21 | [2.42, 3.24] |
| Confidence in coarse-grain information | 0.04 | .00 | [0.03, 0.05] |
| Perceived informativeness of coarse-grain information | 0.05 | .02 | [0.01, 0.08] |
| Perceived informativeness of fine-grain information | -0.02 | .02 | [-0.05, 0.01] |

*Note*. The model included question (*SD* = 0.45) as a random effect.

Inspection of the regression coefficient indicated that, as predicted, perceived informativeness of coarse-grain information significantly predicted the withholding of coarse-grain information. Further, perceived informativeness of coarse-grain information had an effect over and above any influence of confidence. Specifically, the

more informative participants perceived the coarse-grain information to be, the more likely they were to volunteer this information. Using the regression and intercept coefficients, I calculated the odds that coarse-grain information would be volunteered depending on ratings of perceived informativeness. The odds indicated that coarse-grain information was 1.3 times more likely to be volunteered when participants perceived this information to be very informative[16] (24.20) compared to not very informative[17] (18.14). Figure 2 plots the odds of volunteering coarse-grain information across the various ratings of perceived informativeness.

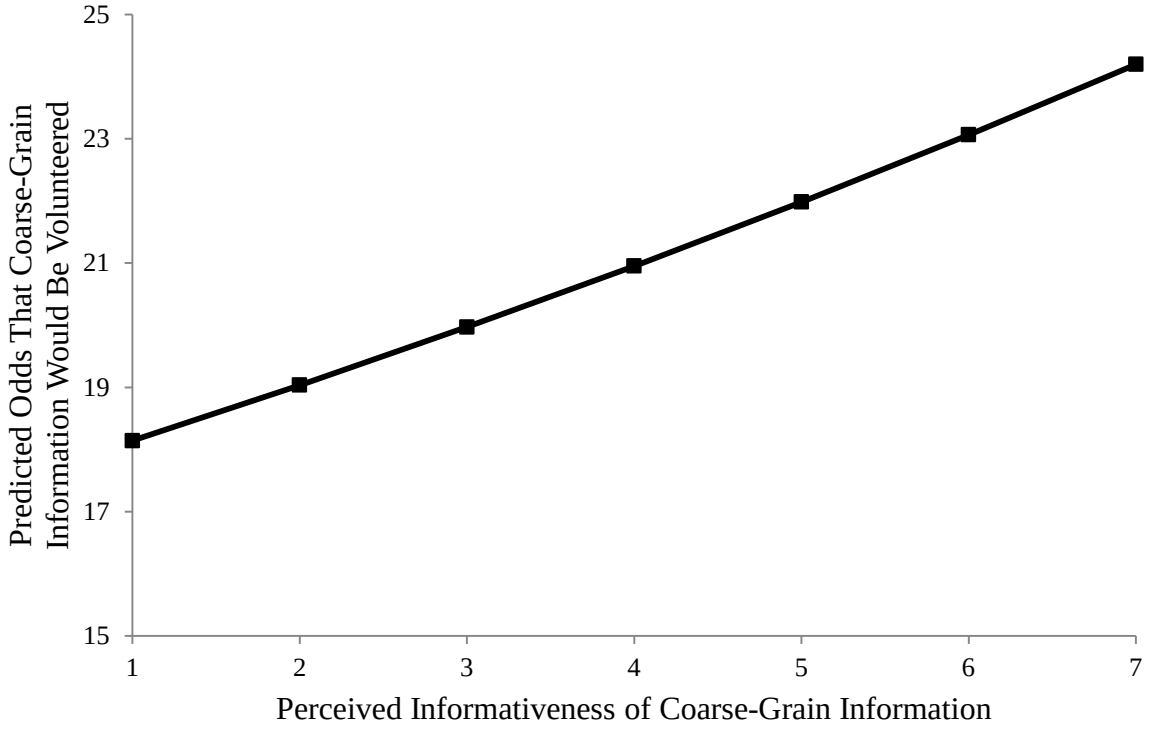


*Figure 2.* Plot of predicted odds of coarse-grain information being volunteered by perceived informativeness of coarse-grain information.

The regression coefficient indicated that perceived informativeness of fine-grain information did not significantly add to this effect. That is, perceived informativeness of

[16] Ratings of seven on the seven-point perceived informative rating scale were considered very informative.
[17] Ratings of one on the seven-point perceived informativeness rating scale were considered not very informative.

fine-grain information did not significantly predict coarse-grain withholding beyond the effect of perceived informativeness of coarse-grain information. The confidence regression coefficient indicated that confidence significantly predicted coarse-grain withholding. The more confident participants were in the coarse-grain information, the more likely they were to volunteer this information.

I developed three additional logistic mixed-effects models to ascertain whether each component or subscale of perceived informativeness predicted coarse-grain withholding. I conducted this analysis to establish whether the different dimensions of the construct had the same contribution. I expected that participants would be more likely to withhold coarse-grain information if they perceived this information to be non-specific, valueless and likely to detrimentally affect their image. In each of the models, I entered coarse-grain withholding as the outcome variable. Again, I classified information as withheld if it was volunteered under forced report but not free report. I entered confidence in coarse-grain information as the first predictor, perceived informativeness of coarse-grain information (for the relevant subscale items) as the second predictor and perceived informativeness of fine-grain information (for the relevant subscale items) as the third predictor. Table 22 presents the model fit statistics and Table 23 the fixed effect coefficients, for all three models.

Table 22

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Models Investigating Whether Ratings of the Subscales of Perceived Informativeness Affected the Withholding of Coarse-Grain Information*

| Subscale | Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|---|
| Value | Confidence in coarse-grain information | 122.61 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 9.42 | 1 | .002 |
| | Perceived informativeness of fine-grain information | 0.44 | 1 | .505 |
| Image | Confidence in coarse-grain information | 123.05 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 1.63 | 1 | .201 |
| | Perceived informativeness of fine-grain information | 2.20 | 1 | .138 |
| Specificity | Confidence in coarse-grain information | 120.96 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 4.10 | 1 | .044 |
| | Perceived informativeness of fine-grain information | 1.34 | 1 | .248 |

Table 23

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Ratings of the Subscales of Perceived Informativeness Affected the Withholding of Coarse-Grain Information*

| Subscale | Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|---|
| Value | Intercept | 2.85 | .20 | [2.44, 3.22] |
| | Confidence in coarse-grain information | 0.04 | .00 | [0.03, 0.04] |
| | Perceived informativeness of coarse-grain information | 0.12 | .04 | [0.04, 0.20] |
| | Perceived informativeness of fine-grain information | -0.03 | .04 | [-0.10, 0.05] |
| Image | Intercept | 2.84 | .21 | [2.41, 3.24] |
| | Confidence in coarse-grain information | 0.04 | .00 | [0.03, 0.05] |
| | Perceived informativeness of coarse-grain information | 0.09 | .05 | [-0.01, 0.18] |
| | Perceived informativeness of fine-grain information | -0.06 | .04 | [-0.15, 0.02] |
| Specificity | Intercept | 2.85 | .21 | [2.41, 3.23] |
| | Confidence in coarse-grain information | 0.04 | .00 | [0.03, 0.05] |
| | Perceived informativeness of coarse-grain information | 0.10 | .04 | [0.01, 0.18] |
| | Perceived informativeness of fine-grain information | -0.04 | .04 | [-0.11, 0.03] |

*Note*. The model included question as a random effect in all three subscale models. Value model question *SD* = 0.45, image model question *SD* = 0.49, specificity model question *SD* = 0.48.

The regression coefficients indicated that perceived informativeness of coarse-grain information significantly predicted the withholding of coarse-grain information across two of the three subscales. This effect was above and beyond that of confidence. In

particular, the more valuable and specific participants perceived the coarse-grain information to be, the more likely they were to volunteer this coarse-grain information. Fine-grain perceived informativeness did not add to this effect in any of the three models.

Taken together, these results suggest three key things. First, my measure of perceived informativeness significantly predicted the withholding of coarse-grain information. Second, as predicted, perceived informativeness of coarse-grain information was driving this effect. Third, perceived informativeness of coarse-grain information predicted coarse-grain withholding, over and above the influence of confidence. This supports my prediction that confidence alone does not entirely guide the decision making process when reporting different levels of detail. It suggests that other factors, not addressed in the monitoring and control model, contribute to the withholding of coarse-grain information. Further, as predicted, this factor is a type of informativeness.

**Grain Size Choice**

In addition to establishing whether perceived informativeness predicted the withholding of coarse-grain information, I also established whether perceived informativeness affected grain size choice. The monitoring and control model focuses upon fine-grain information. It suggests that confidence in the fine-grain response predicts grain size choice (Goldsmith et al., 2005). Accordingly, I expected that perceived informativeness of fine-grain information would predict grain size choice and I anticipated that it would have an effect over and above confidence. I also investigated whether perceived informativeness of coarse-grain information added to this effect. I tested this through four logistic mixed-effects models. One model examined total perceived informativeness and the remaining models assessed the individual components of perceived informativeness. For each model, I entered phase three

preferred responses as the outcome variable. I entered confidence in fine-grain information as the first predictor, perceived informativeness of fine-grain information (for either the total measure or the relevant subscale items) as the second predictor and perceived informativeness of coarse-grain information (total measure or subscale) as the third predictor. See Table 24 for model fit statistics and Table 25 for fixed effect coefficients, for all four models.

Table 24

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Models Investigating Whether Ratings of Perceived Informativeness Affected Grain Size Choice*

| Model | Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|---|
| Total measure | Confidence in fine-grain information | 402.96 | 1 | <.001 |
| | Perceived informativeness of fine-grain information | 22.45 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 15.23 | 1 | <.001 |
| Value subscale | Confidence in fine-grain information | 404.44 | 1 | <.001 |
| | Perceived informativeness of fine-grain information | 14.04 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 19.10 | 1 | <.001 |
| Image subscale | Confidence in fine-grain information | 407.71 | 1 | <.001 |
| | Perceived informativeness of fine-grain information | 19.02 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 9.18 | 1 | .002 |
| Specificity subscale | Confidence in fine-grain information | 407.56 | 1 | <.001 |

| | | | | |
|---|---|---|---|---|
| | Perceived informativeness of fine-grain information | 17.62 | 1 | <.001 |
| | Perceived informativeness of coarse-grain information | 6.97 | 1 | .008 |

Table 25

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Ratings of Perceived Informativeness Affected Grain Size Choice*

| Model | Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|---|
| Total measure | Intercept | 1.03 | .13 | [0.76, 1.29] |
| | Confidence in fine-grain information | -0.05 | .00 | [-0.05, -0.04] |
| | Perceived informativeness of fine-grain information | -0.08 | .01 | [-0.10, -0.05] |
| | Perceived informativeness of coarse-grain information | 0.05 | .01 | [0.02, 0.07] |
| Value subscale | Intercept | 1.02 | .14 | [0.75, 1.28] |
| | Confidence in fine-grain information | -0.05 | .00 | [-0.06, -0.04] |
| | Perceived informativeness of fine-grain information | -0.17 | .03 | [-0.24, -0.11] |
| | Perceived informativeness of coarse-grain information | 0.13 | .03 | [0.07, 0.19] |
| Image subscale | Intercept | 1.02 | .14 | [0.75, 1.28] |
| | Confidence in fine-grain information | -0.05 | .00 | [-0.06, -0.04] |
| | Perceived informativeness of fine-grain information | -0.18 | .03 | [-0.25, -0.11] |
| | Perceived informativeness of coarse-grain information | 0.10 | .03 | [0.04, 0.16] |

| | | | | |
|---|---|---|---|---|
| Specificity subscale | Intercept | 1.01 | .13 | [0.75, 1.27] |
| | Confidence in fine-grain information | -0.05 | .00 | [-0.06, -0.04] |
| | Perceived informativeness of fine-grain information | -0.14 | .03 | [-0.20, -0.09] |
| | Perceived informativeness of coarse-grain information | 0.07 | .03 | [0.02, 0.13] |

*Note*. The model included question as a random effect in all four models. Total measure question *SD* = 0.33, value model question *SD* = 0.34, image model question *SD* = 0.35, specificity model question *SD* = 0.32.

For the model investigating total perceived informativeness, the regression coefficient indicated that perceived informativeness of fine-grain information predicted grain size choice over and above confidence. The more informative participants perceived their fine-grain answer to be, the more likely they were to volunteer this answer as their preferred response. As Figure 3 depicts, fine-grain information was almost 1.6 times more likely to be selected as the preferred response when participants perceived this information to be very informative (2.60) compared to not very informative (1.65).

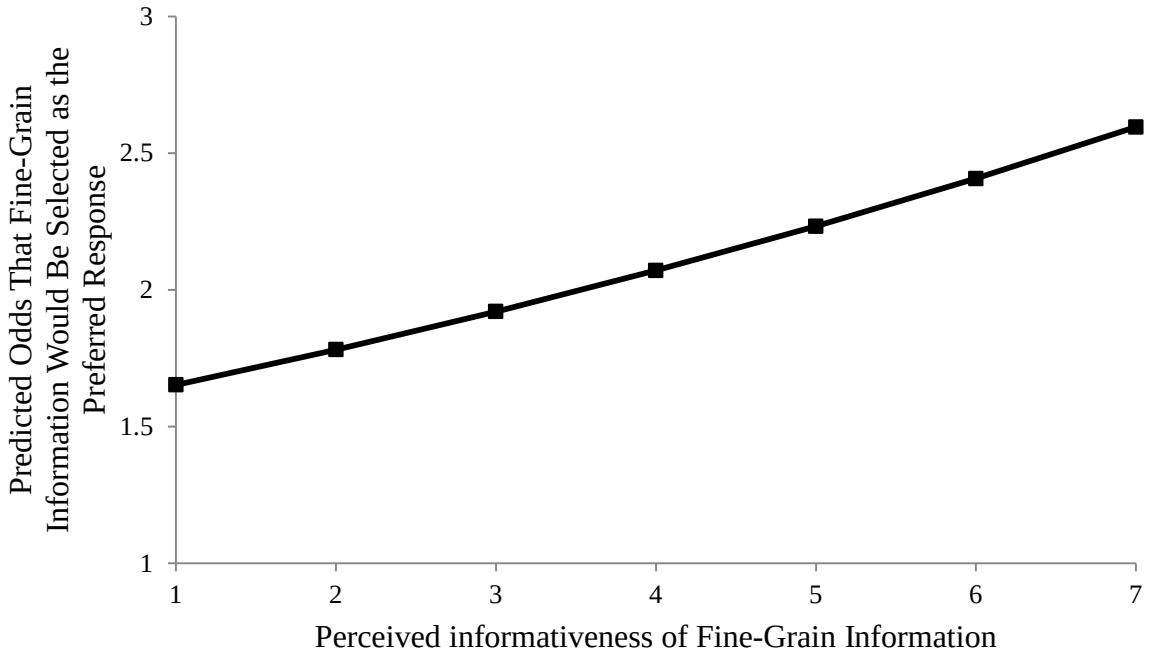


*Figure 3.* Plot of predicted odds of fine-grain information being selected as the preferred response by perceived informativeness of fine-grain information.

Perceived informativeness of coarse-grain information significantly added to this effect. Specifically, the more uninformative participants perceived their coarse-grain answer to be, the more likely they were to volunteer a fine-grain preferred response. As Figure 4 depicts, participants were 1.3 times more likely to select fine-grain information as their preferred response when they perceived coarse-grain information to very uninformative (3.84) compared to very informative (2.93).

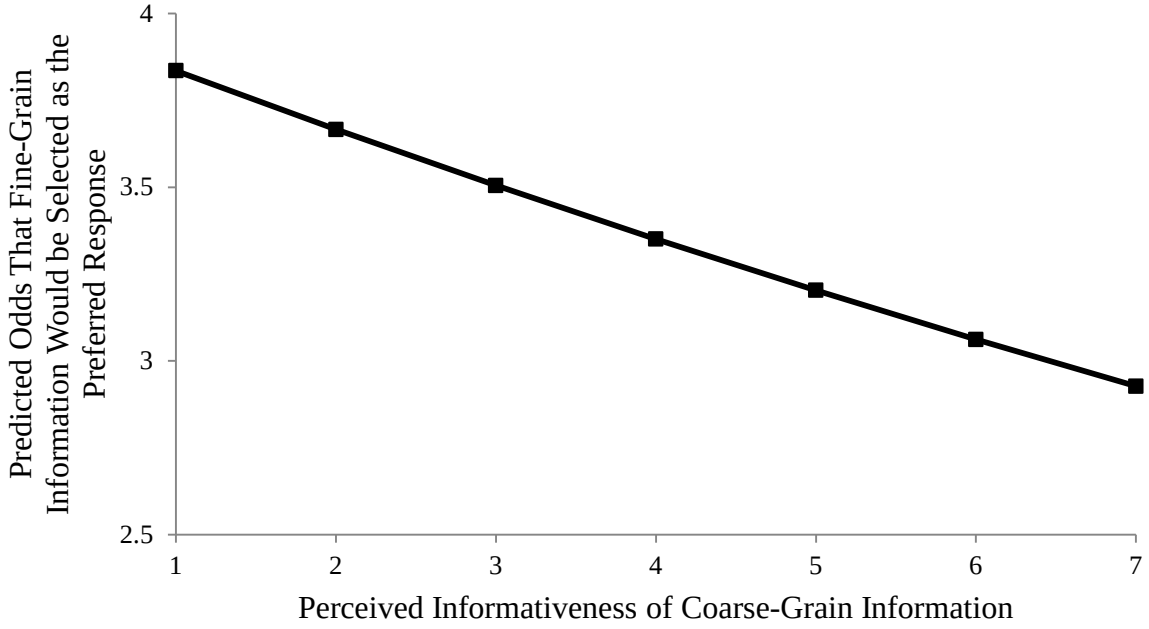


*Figure 4.* Plot of predicted odds of fine-grain information being selected as the preferred response by perceived informativeness of coarse-grain information.

The regression coefficient indicated that confidence in fine-grain information significantly predicted grain size choice. The more confident participants were in the fine-grain information, the more likely they were to select their fine-grain answer as their preferred response.

These results were consistent across all three components of the construct. Perceived informativeness of fine-grain information significantly predicted grain size choice over and above the effect of confidence. The more that participants perceived the fine-grain answer to be valuable, specific and beneficial to their image, the more likely they were to volunteer this answer as their preferred response. Perceived informativeness of coarse-grain information significantly added to this effect. In particular, the more that participants perceived the coarse-grain answer as valueless, non-specific and detrimental to their image, the more likely they were to volunteer the fine-grain alternative as their preferred response.

The grain size choice findings demonstrate that perceived informativeness significantly predicted grain size choice over and above confidence. This supports the prediction that, in addition to determining their confidence in retrieved information, people may also determine how informative they perceive this information to be. Further, this judgement of perceived informativeness affected the subsequent decision regarding what information should be volunteered. Additionally, perceived informativeness affected grain size choice in two ways. Both perceived informativeness of fine-grain information and perceived informativeness of coarse-grain information predicted grain size choice. Fine-grain information was often selected as the preferred response because the fine-grain information was perceived to be informative and the coarse-grain information was perceived to be uninformative. Lastly, the finding that fine-grain confidence predicted grain size choice further supports the confidence mechanism of the monitoring and control model.

**Monitoring and Control**

In addition to determining why coarse-grain information is sometimes withheld, I also investigated how this information is withheld. Study 1 and 2 results suggested that participants were able to monitor the accuracy of their retrieved information successfully. This indicates that coarse-grain information was not withheld because of deficient monitoring ability. This also suggests that perhaps coarse-grain information was withheld through ineffective control. I also tested this in Study 4. I entered phase two (forced-report) accuracy, for both fine and coarse-grain answers together, as the outcome variable and phase two confidence, for both answer types, as the predictor variable. Model fit statistics indicated that confidence significantly improved the fit of the model, $\chi^2(1) = 57.23$, $p < .001$, and the regression coefficient indicated that confidence significantly predicted accuracy, $b = 0.02$, $SE_b = .00$, 95% CI [0.01, 0.02], intercept $b = -1.21$ ($SE_b = .65$), item $SD = 2.01$. The more confident participants were in

the information, the greater the likelihood that this information would be correct. This suggests that monitoring was successful and that participants were reasonably good at determining whether the information retrieved was likely to be accurate. Consistent with Studies 1 and 2, this indicates that coarse-grain information was not withheld through deficient monitoring, suggesting that perceived informativeness may affect information reporting by impacting the process of control.

## Discussion

Study 4 examined whether perceived informativeness, and its component subscales, predicted the withholding of coarse-grain information and grain size choice. Indeed, perceived informativeness did significantly predict both coarse-grain withholding and grain size choice. Participants were more likely to withhold coarse-grain information when they perceived the information to be uninformative. Participants were more likely to select their fine-grain answer as their preferred response when they perceived the fine-grain answer to be informative and the coarse-grain answer to be uninformative. Additionally, results were consistent with the confidence mechanism of the monitoring and control model and also demonstrated that people were able to successfully monitor the accuracy of their retrieved information.

These findings provide evidence that perceptions of informativeness affect memory reporting. Further, they suggest that coarse-grain information is perhaps withheld because perceived informativeness may affect the process of control. That is, in addition to determining their confidence and likely accuracy when deciding whether they will report information, people may also assess the perceived informativeness of the information. If they perceive the information to be uninformative they may make the flawed decision to withhold this information, despite their confidence in the information being high and the information likely correct.

These findings have important implications for the memory reporting literature. They provide evidence of why eyewitnesses sometimes withhold coarse-grain information from memory reports. When combined with Study 1 and 2 findings, these results suggest that eyewitnesses withhold coarse-grain information because they are motivated to be informative and that they do not like to volunteer information that they perceive to be uninformative. These perceptions of informativeness include judgements of how specific the information is, how valuable it is and how volunteering this information would likely affect their image. This provides great insight into why eyewitnesses behave this way when providing memory reports.

These results also suggest that the conceptualisation of informativeness in the literature requires revision. Instead of focusing simply on the motivation to provide fine-grain reports, a broader perspective should be taken. It should be acknowledged that what constitutes informativeness requires judgements on the part of the person providing a memory report, with these judgments likely to vary across individuals. Further, this study investigated whether the individual components of perceived informativeness affected memory reporting. Results indicated that the different dimensions in the measure each had some contribution. These findings reinforce the fact that perceived informativeness is multi-faceted and suggest that informativeness should not be defined purely as specificity; informativeness also includes judgements of importance, value and perhaps image. Thus, perceived informativeness and its various dimensions should be included in future conceptualisation of informativeness.

These findings also provide evidence of how coarse-grain information is withheld. Results throughout this thesis have indicated that participants were successful at monitoring the accuracy of their retrieved information. This suggests that poor control, not deficient monitoring, may be responsible for this behaviour. Koriat and Goldsmith's (1996) model provides a good explanation as to why people report information. That is,

the model captures the process that people go through when reporting information. However, the model is unable to explain why people withhold information. This research provides evidence that the monitoring and control model should be expanded to include the effect of perceptions of informativeness on control and reporting.

This research provides preliminary evidence that coarse-grain information is withheld because of perceptions of informativeness. Further, it suggests that people will volunteer coarse-grain information if they perceive it to be informative. In Chapter 6 I report three studies which investigated whether experimental manipulations designed to affect judgments of perceived informativeness cause the withholding of coarse-grain information. I conducted these studies to determine whether perceptions of informativeness could be controlled and the nature of memory reporting altered by changing participants' global views regarding the informativeness of coarse-grain information.

# CHAPTER 6

## Studies 5a, 5b and 5c: Changing Perceptions of Informativeness

Study 4 used the perceived informativeness measure developed in Study 3 to determine whether perceived informativeness predicted the withholding of coarse-grain information. The results indicated that perceived informativeness and its subcomponents predicted coarse-grain withholding. Coarse-grain information was more likely to be withheld when people perceived it to be uninformative, valueless and unspecific and when they believed that it would be detrimental to their image to volunteer such information. Studies 5a-c tested the relationship between perceived informativeness and coarse-grain withholding within an experimental paradigm. In each of these studies, I attempted to manipulate perceptions of the informativeness of coarse-grain information to establish whether perceived informativeness causes coarse-grain information withholding and to ascertain whether perceptions of informativeness could be controlled and changed.

I used different approaches to the manipulation of perceived informativeness across the three studies. The manipulations in Studies 5a and 5b were explicit instructional manipulations, while the Study 5c manipulation was subtle in comparison. Regardless, all three manipulations had the same general aim. In each study the objective was to change the way in which participants perceived coarse-grain information by demonstrating the benefits and importance of coarse-grain information to experimental group participants, expecting that this would alter the way these participants viewed coarse-grain information. Specifically, I anticipated that learning the benefits of coarse-grain material would lead experimental group participants to perceive coarse-grain information to be more informative compared to the control group. In turn, I predicted that experimental group participants would subsequently volunteer more, and withhold less, coarse-grain information, compared to control group participants.

## Study 5a

Study 5a used an instructional manipulation in an attempt to change the perceived informativeness of coarse-grain information. The experimental instructions outlined the benefits, and provided an example illustrating the value, of coarse-grain information. Control group instructions did not discuss coarse-grain value. As outlined above, I expected that informing experimental group participants of the value of coarse-grain information would alter their perceptions of this type of information. I anticipated that experimental group participants would perceive coarse-grain information to be more informative and, in turn, would volunteer more coarse-grain information in their memory report and provide fewer fine-grain preferred responses, compared to the control group.

Study 5a also examined whether any effect of perceived informativeness on coarse-grain withholding was generalizable. Participants were pre-exposed to one of two types of information (clothing or robbery events). Pre-exposed information comprised material that participants believed was already known to police. In the clothing condition, participants were told that the suspects were apprehended at the crime scene so the police know what pants, shirts, jackets, shoes, hats and bags the suspects were wearing. In the robbery events condition, participants were told that the police were able to get to the crime scene quickly and immediately interview eyewitnesses. As a result of these interviews, the police knew how many staff members and customers were in the bank at the time of the robbery, where the offenders stood, how many times they spoke, what was said, the amount of money stolen and the duration of the robbery. The information available in the participant's memory should prove valuable by corroborating what the police already knew. All participants answered questions about both the offenders clothing and robbery events. Through contrasting coarse-grain

withholding between pre-exposed and non pre-exposed items, I investigated whether any observed effect of perceived informativeness on coarse-grain withholding was specific to the aspect of the crime participants were pre-exposed to, or generalized to other, non pre-exposed, aspects. That is, when told that coarse-grain information regarding one aspect of the crime is valuable, do participants generalise this and understand that coarse-grain information concerning other aspects of the crime can also be valuable? Or do participants fail to generalise this information and only grasp the value of the information to which they were directly pre-exposed?

Finally, I predicted that, consistent with previous studies, participants would be able to successfully monitor the accuracy of their information, offering additional support for the notion that the process of control is affected when coarse-grain information is withheld.

## Method

### Participants

I recruited 51[18] participants (21 men and 30 women) from the Flinders University campus, the School of Psychology research participation system and the eyewitness laboratory email list. Participants were financially reimbursed or allocated course credit for their involvement. Average age of participants was 26.9 years (*SD* = 8.0).

### Design

A 2 (perceived informativeness: experimental, control) × 2 (crime information: clothing, situation) between groups experimental design determined whether perceived informativeness caused the withholding of coarse-grain information and established whether any effect observed was specific or generalizable.

[18] I initially intended to recruit 80 participants (20 for each of the four cells). However, I did not want to use resources obtaining this many participants if the manipulation was unsuccessful. For this reason, I checked the manipulation during data collection to determine if there was a significant difference in ratings of the perceived informativeness of coarse-grain information, between the two groups. Results indicated that the two groups did not significantly differ in their ratings (results presented in text). This suggests that my manipulation had not successfully altered the experimental group's perceptions of the value of coarse-grain information. As a result, I ceased data collection for Study 5a.

**Experimental Manipulations**

Participants received one of four different instructions (experimental-clothing, experimental-situation, control-clothing, control-situation). Experimental instructions outlined the benefits of coarse-grain information at length. Experimental group participants were told that it is great the police already have information; however this information is useless unless it is corroborated. Participants were told that a lot of people think that general information is too vague and not informative. They were told that people often think that they will look silly if they volunteer this information. In reality though, this information can be very important and even crucial to a police investigation. Even the most seemingly trivial or general detail could corroborate the information already known to the police officers. General information could add to the evidence against the suspect. This would help the police in securing a guilty verdict and ensure that the potentially dangerous offenders are off the streets and unable to reoffend. In other situations, a general detail could also inform the police if they have the wrong suspect or could give the police a valuable lead and greatly narrow their search. Experimental group participants were then provided with an example to illustrate these benefits. Control information did not outline such benefits. By comparing coarse-grain withholding between the experimental and control conditions, I determined whether perceived informativeness caused the withholding of coarse-grain information.

Clothing instructions stated that the police knew what clothing the suspects wore during the robbery. Situation instructions asserted that the police knew what events unfolded during the robbery. Through contrast between the clothing and robbery situation conditions, I ascertained whether reporting of coarse-grain information was specific and occurred only for items that the participant was pre-exposed to (reported coarse-grain clothing answers if in the clothing condition or reported coarse-grain situation answers if in the robbery situation condition) or generalizable and occurred for

items that the participant was not pre-exposed to (participants in the robbery situation reported coarse-grain clothing items or clothing group participants reported situation items).

**Materials**

**Stimulus video.** The ANZ mock bank robbery video from Studies 1, 2 (light condition), 3 and 4 was used.

**Grain size questionnaire.** All participants answered the same 10 grain size questions. Five questions were based on the offenders' clothing. All of these questions asked for colours seen in the film. The remaining five questions asked about the robbery situation. These items required numeric responses. In line with the previous studies, participants provided a fine-grain answer and confidence rating as well as a coarse-grain answer and confidence rating, for every question. The order in which these grain size questions were posed was counterbalanced. I used the same confidence rating scales as Studies 1-4. Participants completed the grain size questionnaire in three phases. In phase one, participants answered the grain size questions under free-report instructions. Participants were able to either provide an answer and confidence rating or circle the "don't know" option available. In phase two, participants completed the same questionnaire under forced-report instructions. In this phase participants provided an answer for any question to which they initially responded "don't know". Finally, in phase three, I removed confidence ratings and participants selected a final preferred response for every question.

**Manipulation check measure.** The concise perceived informativeness measure that I developed in Study 3 was used as the manipulation check measure. The measure consisted of two value items, two image items and two specificity items. Participants answered the six items twice, once for the fine-grain answer and once for the coarse-

grain answer. Participants received the same written scenario, items and response scale used in Studies 3 and 4. Items were presented in the same order as Study 4.

Participants answered the perceived informativeness measure once, in a separate booklet, after all three phases of the grain size interview were completed. The perceived informativeness measure was answered after completion of the grain size questionnaire to ensure that the perceived informativeness manipulation (not the taking of the measure) induced any observed effect on coarse-grain withholding and grain size choice.

**Procedure**

Participants received verbal instructions outlining how the session would proceed before reading the introduction letter, completing the consent form and watching the stimulus video in their laboratory cubicle. Participants completed the same distracter task used in Studies 2, 3 and 4 before receiving one of the four randomly allocated instructions on their computer. Participants then received the phase one (free-report) instruction booklet and the grain size interview booklet. Participants commenced phase one of the grain size questionnaire using a black pen. In phase one participants were able to provide answers or circle the “don’t know” option available. Specific encouragement to use this option was not provided. Upon completion, participants received the phase two (forced-report) instructions. I also removed black pens and distributed red ones. In phase two, participants were required to provide answers to questions to which they originally responded “don’t know”. Following this, I removed participants’ confidence ratings and distributed phase three (preferred response) instructions. In this phase participants were required to select a final preferred response (either their coarse-grain answer *or* their fine-grain answer) for every question. Phase three was completed using a blue pen. Use of different coloured ink allowed me to determine which answers were volunteered during the various phases. Removing

confidence ratings prior to the commencement of phase three ensured that phase three choices were not affected by confidence ratings. Lastly, participants completed the 12 item perceived informativeness manipulation check questionnaire before being thanked, debriefed and reimbursed for their time, either financially or through course credit.

## Results and Discussion

Two answers (0.39% of all answers) were excluded from analyses as the fine-grain answer was correct and the coarse-grain answer incorrect. I also reverse scored negatively worded perceived informativeness items so that higher scores represented greater perceived informativeness. To determine whether any observed effect of perceived informativeness was generalizable, I created a pre-exposure to items variable. I created this variable by calculating whether each question was pre-exposed (a clothing item if they were pre-exposed to clothing information or a situation item if they were pre-exposed to information about the situation) or not pre-exposed (a clothing item if they were pre-exposed to situation or a situation item if they were pre-exposed to clothing), for every participant.

### Manipulation Check

I expected that my manipulation of perceived informativeness would alter participants' perceptions of coarse-grain information. Specifically, the manipulation was intended to increase how informative experimental group participants perceived coarse-grain information to be. I assessed perceived informativeness using the concise perceived informativeness measure I developed in Study 3. Participants rated their fine and coarse-grain answers across six items. I combined coarse-grain ratings to form a total perceived informativeness of coarse-grain information score, for each participant. Scores could range from 6-42. Using an independent samples *t* test, I determined whether ratings of perceived informativeness of coarse-grain information differed between the experimental and control groups. Results suggested that the experimental

(*M* = 27.15, *SD* = 4.85) and control (*M* = 25.48, *SD* = 5.04) groups did not differ significantly in their ratings of the perceived informativeness of coarse-grain information $t(49) = -1.21$, $p = .233$, $d = 0.35$, $d$ 95% CI [-0.21, 0.90]. This indicates that the manipulation was unsuccessful. The manipulation of perceived informativeness in Study 5a was not able to change how informative experimental group participants perceived coarse-grain information to be.

Despite the manipulation being unsuccessful, I analysed all of the Study 5a data. The manipulation check measure was devised for multiple use in a single situation and was tested within this framework in Study 4. In Study 4, participants completed the perceived informativeness measure for each individual grain size question. However, in Study 5a, participants completed the perceived informativeness measure only once after all grain size questions had been answered. As a result, it is possible that the manipulation was successful, but, the manipulation check measure was not sensitive enough to determine this. Accordingly, through additional analyses, I determined whether perceived informativeness predicted coarse-grain withholding and grain size choice. I also conducted analyses testing the monitoring and control model (Koriat & Goldsmith, 1996) as these analyses were not dependent on the manipulation. The possibility that the manipulation check may have been inappropriate, and unable to detect the success of the manipulation, was not one I considered until after data collection for Studies 5a-c was complete. Consequently, I was not able to state the effectiveness of the manipulation with certainty in all three studies.

**Withholding of Coarse-Grain Information**

Participants withheld 64 (12.6%) coarse-grain answers in Study 5a. I determined whether perceived informativeness caused the withholding of this coarse-grain information. Koriat and Goldsmith's (1996) monitoring and control model posits that confidence guides the decision to withhold or volunteer information. Accordingly, I

investigated the influence of perceived informativeness on the withholding of coarse-grain information, after controlling for the effects of confidence. That is, I determined whether perceived informativeness affected coarse-grain withholding over and above the influence of confidence. As I was investigating the withholding of coarse-grain information, I controlled for confidence in coarse-grain (as opposed to fine-grain) information. I also determined whether any effect of perceived informativeness on coarse-grain withholding was specific and occurred for only those aspects of the crime the participant was pre-exposed to, or generalizable, affecting other, non pre-exposed, aspects of the crime. In sum, I developed a logistic mixed-effects model to ascertain whether my manipulation of perceived informativeness predicted the withholding of coarse-grain information over and above the effect of coarse-grain confidence and to examine whether the perceived informativeness manipulation differed in its effect on coarse-grain withholding between pre-exposed and non pre-exposed items.

In line with Studies 2 and 4, I analysed only instances where fine-grain information was withheld under free report. I was interested in coarse-grain reporting when fine-grain information could not be retrieved. Coarse-grain information is less informative than fine-grain information (Yaniv & Foster, 1995) so is of little value when fine-grain information can be reported. I entered withholding of coarse-grain information as the outcome variable. Coarse-grain information was considered withheld if it was volunteered under forced report but not free report. I entered phase two (forced-report) confidence in coarse-grain information as the first predictor, the perceived informativeness manipulation as the second predictor, pre-exposure to item as the third predictor and the interaction between the perceived informativeness manipulation and pre-exposure to item as the fourth predictor. See Table 26 for model fit statistics and Table 27 for fixed effect coefficients.

Table 26

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in coarse-grain information | 83.16 | 1 | <.001 |
| Perceived informativeness manipulation | 3.21 | 1 | .073 |
| Pre-exposure to items | 0.11 | 1 | .736 |
| Perceived informativeness manipulation × pre-exposure to items | 0.93 | 1 | .335 |

Table 27

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 1.90 | .33 | [1.22, 2.52] |
| Confidence in coarse-grain information | 0.05 | .01 | [0.03, 0.06] |
| Perceived informativeness manipulation | 0.80 | .43 | [-0.07, 1.61] |
| Pre-exposure to items | 0.37 | .43 | [-0.48, 1.19] |
| Perceived informativeness manipulation × pre-exposure to items | -0.55 | .61 | [-1.74, 0.65] |

*Note*. The model included question (*SD* = 0.29) as a random effect. The percentage confidence rating scale consisted of ten percent increments which were available as a response options. I used the same rating scale in Studies 5b and 5c.

Inspection of the regression coefficient indicated that contrary to prediction, my perceived informativeness manipulation did not significantly predict the withholding of

coarse-grain information. This was consistent with the aggregate statistics which indicated that the experimental group withheld, on average, 1.19 (*SD* = 1.32) coarse-grain responses and the control group withheld, on average, 1.32 (*SD* = 1.11) coarse-grain responses. The regression coefficient also indicated that pre-exposure to item did not significantly predict coarse-grain withholding, indicating that withholding of coarse-grain information did not differ depending on whether the information was pre-exposed or not pre-exposed. The interaction between the perceived informativeness manipulation and pre-exposure to item also did not significantly predict the withholding of coarse-grain information. This suggests that the extent to which perceived informativeness predicted coarse-grain withholding did not differ significantly depending on pre-exposure. See Table 28 for the aggregate statistics reflecting the actual amount of coarse-grain information withheld by the experimental and control groups, separated by pre-exposure. Finally, as Koriat and Goldsmith (1996) proposed, confidence did significantly predict the decision to withhold or volunteer information. Specifically, the more confident participants were in their coarse-grain information, the more likely they were to volunteer this information in their memory report. This suggests that confidence guided the decision to report or withhold information; however, perceived informativeness did not affect this decision over and above the influence of confidence.

Table 28

*Mean Number of Coarse-Grain Answers Withheld by the Experimental and Control Groups, Separated by Pre-Exposure and Items*

| | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| Pre-exposed | Items | *M* | *SD* | *M* | *SD* |
| Yes | Clothing | 1.00 | 1.08 | 0.54 | 0.88 |
| | Situation | 0.77 | 1.17 | 0.42 | 0.67 |
| No | Clothing | 0.77 | 0.83 | 0.92 | 0.90 |
| | Situation | 0.31 | 0.63 | 0.31 | 0.63 |

**Grain Size Choice**

In addition to investigating the withholding of coarse-grain information, I also examined whether perceived informativeness affected grain size choice. Again, the monitoring and control model and empirical research (Goldsmith et al., 2005; Koriat & Goldsmith, 1996) suggest that confidence affects the decision to withhold or volunteer information. Specifically, Goldsmith et al. (2005) suggest that confidence in fine-grain information guides the grain size of memory reports. Accordingly, I created a logistic mixed-effects model to ascertain whether perceived informativeness affected grain size choice over and above the influence of confidence in fine-grain information and to determine whether the effect of perceived informativeness on grain size choice differed depending on pre-exposure to items.

I entered phase three preferred responses as the outcome variable and phase two (forced-report) confidence in fine-grain information as the first predictor. I entered the perceived informativeness manipulation as the second predictor, pre-exposure to item as the third predictor and the interaction between the perceived informativeness

manipulation and pre-exposure to item as the fourth predictor. See Table 29 for model fit statistics and Table 30 for fixed effect coefficients.

Table 29

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in fine-grain information | 94.19 | 1 | <.001 |
| Perceived informativeness manipulation | 0.28 | 1 | .596 |
| Pre-exposure to items | 1.39 | 1 | .238 |
| Perceived informativeness manipulation × pre-exposure to items | 1.56 | 1 | .212 |

Table 30

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 1.19 | .29 | [0.60, 1.74] |
| Confidence in fine-grain information | -0.04 | .00 | [-0.05, -0.03] |
| Perceived informativeness manipulation | -0.17 | .33 | [-0.80, 0.48] |
| Pre-exposure to items | -0.53 | .30 | [-1.12, 0.06] |
| Perceived informativeness manipulation × pre-exposure to items | -0.54 | .44 | [-0.32, 1.40] |

*Note*. The model included question (*SD* = 0.54) as a random effect.

Contrary to prediction, the regression coefficient indicated that my perceived informativeness manipulation did not significantly predict grain size choice. Aggregate

statistics reflected this same pattern. For the experimental group, the mean proportion of phase three preferred responses that were fine-grain was .30 (*SD* = .20). For the control group, the mean proportion of phase three preferred responses that were fine-grain was .35 (*SD* = .15). Regression coefficients also indicated that pre-exposure to item and the interaction between the perceived informativeness manipulation and pre-exposure were not significant predictors of grain size choice. This indicates that grain size choice did not differ for pre-exposed and non pre-exposed items and that the extent to which perceived informativeness predicted grain size choice did not differ significantly depending on pre-exposure. See Table 31 for the aggregate statistics depicting grain size choice for the experimental and control groups, separated by pre-exposure. Finally, as Goldsmith et al. (2005) proposed, fine-grain confidence did significantly predict grain size choice. The more confident participants were in their fine-grain information, the more likely they were to select this fine-grain answer as their preferred response. Taken together, these results suggest that confidence determined grain size choice, however, contrary to prediction; my manipulation of perceived informativeness did not affect grain size choice above and beyond the influence of confidence.

**Monitoring and Control**

Koriat and Goldsmith (1996) and Goldsmith et al. (2005) proposed that confidence guides the decision to report or withhold information. They posited that people retrieve a best candidate fine-grain answer and assess the likely accuracy of this answer by gauging their confidence in the response (Goldsmith et al., 2005). If their confidence and likely accuracy exceeds a pre-set threshold, the fine-grain answer will be volunteered. If their confidence and likely accuracy do not exceed the threshold, a coarse-grain answer will be retrieved and provided instead (Goldsmith et al., 2005).

Table 31

*Mean Proportion of Fine-Grain Preferred Responses Selected by the Experimental and Control Groups, Separated by Pre-exposure and Items*

| | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| Pre-exposed | Items | *M* | *SD* | *M* | *SD* |
| Yes | Clothing | .32 | .29 | .38 | .19 |
| | Situation | .23 | .20 | .20 | .24 |
| No | Clothing | .40 | .27 | .40 | .23 |
| | Situation | .25 | .30 | .40 | .29 |

The research in this thesis investigated the role of informativeness in the withholding of coarse-grain information, within the framework of the monitoring and control model (Koriat & Goldsmith, 1996). I predicted that perceived informativeness has an effect over and above confidence, affecting the process of control and leading to the withholding of coarse-grain information. As my research was conducted within the monitoring and control framework, it is important that I empirically test the model.

I tested the confidence mechanism in the logistic mixed-effects model described above with grain size choice as the outcome. Results indicated that confidence in fine-grain information was a significant predictor of grain size choice. Specifically, the more confident participants were in their fine-grain information, the more likely they were to volunteer this fine-grain answer as their preferred response. This finding is consistent with Goldsmith et al.'s (1996) results and offers confirmation and support for the confidence mechanism within their monitoring and control model. This result also supports me testing the effects of perceived informativeness over and above confidence.

I predicted that, when coarse-grain information was withheld, the control aspect of Koriat and Goldsmith's (1996) model, was affected. I predicted that people are able to monitor successfully and that poor decision making underlies coarse-grain withholding. That is, people chose to withhold coarse-grain information. To investigate this, I created a logistic mixed-effects model to investigate monitoring ability. I entered phase two (forced-report) accuracy (for both fine and coarse-grain answers together) as the outcome variable and forced-report confidence (for both fine and coarse-grain answers) as the predictor. Confidence significantly improved the fit of the model $\chi^2(1) = 19.42$, $p = .010$. The regression coefficient indicated that confidence significantly predicted accuracy and when confidence was high, so too was the probability that the response would be accurate $b = 0.02$, $SE_b = .00$, 95% CI [0.01, 0.03], intercept $b = -1.33$ ($SE_b = .40$), question random effect $SD = 1.24$. This suggests that participants were able to successfully monitor their accuracy to determine whether their retrieved information was likely to be correct. This indicates that monitoring was not the aspect of Koriat and Goldsmith's model affected when coarse-grain information was withheld, giving credence to the proposition that poor control underlies coarse-grain withholding.

## Study 5b

Study 5a had two limitations: the inclusion of crime information in the instructions and the lack of comparable control group instructions. These limitations potentially affected the success of the instructional perceived informativeness manipulation. These limitations were rectified in Study 5b so that the instructional manipulation could be properly tested.

Information about the crime (clothing and robbery situation) was included in Study 5a so that participants would appreciate that their coarse-grain information is informative as it can corroborate what is already known to the police. However, in retrospect, this crime information may have prevented the perceived informativeness

manipulation from successfully altering participants' perceptions of the informativeness of coarse-grain information. Participants may have actually perceived their coarse-grain information to be uninformative as the police already knew a large proportion of the information available in the participants' memories. Participants may have believed that their information was unhelpful and not valuable as they could not provide the police with many new details. Therefore, I removed all crime information from Study 5b's instructional manipulation.

In Study 5a the experimental groups received information outlining the benefits of coarse-grain information, combined with one of two different types of crime information (clothing or robbery situation). Control groups received the crime information only. This did not provide the optimal comparison for the experimental group. In retrospect, control group participants should have received a similar amount of information covering similar content to the experimental group, with the only difference being that the control group did not learn the value of coarse-grain information. As a result, instructional information illustrating the broad benefits of eyewitness information was provided for the control group in Study 5b. This information was similar, in both length and content, to the information presented to the experimental group.

In line with Study 5a, I predicted that experimental group participants would realise the value of coarse-grain information, would perceive coarse-grain information to be more informative and would in turn volunteer more coarse-grain information and fewer fine-grain preferred responses, compared to the control group. I predicted that perceived informativeness would affect the withholding of coarse-grain information and grain size choice over and above the influence of confidence. Finally, I expected that participants would be able to monitor successfully.

## Method

### Participants

I recruited 90[19] participants (31 men and 59 women) from the Flinders University campus, the School of Psychology research participation system and the eyewitness laboratory email list. Mean age of participants was 22.3 years (*SD* = 6.1). Participants were financially reimbursed or allocated course credit for their involvement.

### Design

I investigated whether perceived informativeness caused the withholding of coarse-grain information, using a between groups experimental design. I randomly allocated participants to one of two perceived informativeness conditions (experimental, control).

### Experimental Manipulation

Participants received one of two types of instructional information. Experimental group participants received the same information as the experimental group in Study 5a. The benefits of coarse-grain information were outlined and examples provided. The control group received a variation of this same information. I slightly reworded the information and examples to demonstrate the value and importance of eyewitness information generally. This ensured that the two groups were exposed to similar content and amounts of information, with only the experimental groups perceptions of coarse-grain information altered.

### Materials

Study 5b used the same stimulus video, grain size questionnaire and manipulation check questionnaire as Study 5a.

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[19] I recruited 20 participants to pilot my second attempt at manipulating perceived informativeness. Pilot results indicated that experimental group participants perceived their coarse-grain answers to be more informative (*M* = 29.10, *SD* = 6.62) compared to the control group (*M* = 25.50, *SD* = 6.24). While this difference was not statistically significant (*t*(18) = -1.25, *p* = .227), the effect size was moderate (*d* = 0.59, *d* 95% CI [-0.31, 1.48]). Following this, I ran a power analysis using the pilot data, to determine how many additional participants should be recruited. According to Tabachnick and Fidell (2013), .80 reflects desired power for psychological research. Results indicated that I would need 46.07 participants in each of my two cells to obtain power of .8. As a result, I recruited an additional 70 participants to give a sample of 90.

## Procedure

Study 5b followed the same procedure as Study 5a. However, participants were randomly allocated to receive one of two (rather than four) types of instructional information.

## Results and Discussion

I excluded eight answers (0.89% of all answers) from analyses as the fine-grain answer was correct and the coarse-grain answer incorrect. Again, I reverse scored negatively worded perceived informativeness items.

### Manipulation Check

I included a manipulation check measure in the experimental session to determine whether my instructional manipulation of perceived informativeness was successful. I expected that participants in the experimental condition would recognise the value of coarse-grain information and would in turn perceive coarse-grain information to be more informative compared to the control group. Specifically, I predicted that the experimental groups' ratings of the perceived informativeness of coarse-grain information would be significantly higher compared to the control group. In line with Study 5a, participants completed the concise perceived informativeness measure once, after answering all grain size questions. I calculated a total perceived informativeness of coarse-grain information score for all participants (scores could range from 6-42). Using an independent samples *t* test, I determined whether ratings of perceived informativeness of coarse-grain information differed between the experimental and control groups. Results suggested that, contrary to prediction but consistent with Study 5a results, the experimental ($M$ = 27.44, $SD$ =5.50) and control ($M$ = 26.87, $SD$ = 6.00) groups did not differ significantly in their ratings of the perceived informativeness of coarse-grain information $t(88) = -0.48$, $p = .635$, 95%, $d = 0.10$, $d$ 95% CI [-0.31, 0.51]. This indicates that the manipulation was not able to successfully alter perceptions of the

informativeness of coarse-grain information. However, again, it must be noted that as the manipulation check measure was not applied in the way in which it was tested, there is a possibility that the manipulation was successful but the manipulation check measure was unable to detect this.

**Withholding of Coarse-Grain Information**

Participants withheld 83 (9.3%) coarse-grain answers in Study 5b. I determined whether my manipulation of perceived informativeness predicted this withholding of coarse-grain information. As I have outlined previously, confidence is thought to guide the decision to report or withhold information (Koriat & Goldsmith, 1996). Accordingly, I ascertained whether perceived informativeness affected coarse-grain withholding over and above the influence of confidence. Specifically, I controlled for confidence in coarse (rather than fine) grain information as I was investigating coarse-grain withholding. In sum, I developed a logistic mixed-effects model to determine whether my instructional manipulation of perceived informativeness predicted the withholding of coarse-grain information from a memory report, over and above the influence of confidence in coarse-grain information. Again, only instances where fine-grain information was withheld under free report were included in the model. I entered withholding of coarse-grain information as the outcome variable. Coarse-grain information was considered withheld if it was volunteered under forced report but not free report. I entered phase two (forced-report) confidence in coarse-grain information as the first predictor and the perceived informativeness manipulation as the second predictor. See Table 32 for model fit statistics and Table 33 for fixed effect coefficients.

Table 32

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in coarse-grain information | 205.96 | 1 | <.001 |
| Perceived informativeness manipulation | 2.49 | 1 | .115 |

Table 33

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 3.24 | .28 | [2.65, 3.73] |
| Confidence in coarse-grain information | 0.07 | .01 | [0.06, 0.09] |
| Perceived informativeness manipulation | 0.45 | .30 | [-0.14, 1.02] |

*Note*. The model included question (*SD* = 0.23) as a random effect.

The regression coefficient indicated that perceived informativeness did not significantly predict the withholding of coarse-grain information. This was inconsistent with aggregate statistics which indicated that the experimental group withheld, on average, 0.58 (*SD* = 0.89) coarse-grain answers and the control group withheld, on average, 1.27 (*SD* = 1.64) coarse-grain answers. Indeed, an independent samples *t* test suggested that these means differed significantly. However, this difference was most

likely artificial as unlike the model; the *t* test did not take confidence or variability in question difficulty into consideration. I developed an additional logistic mixed-effects model similar to the one outlined above. However, in this model I did not control for confidence. Without confidence, the relationship between perceived informativeness and coarse-grain withholding was significant ($\chi^2(1) = 10.52$, $p = .001$, $b = 0.74$, $SE_b = .25$, 95% CI [0.23, 1.21], intercept $b = 1.91$ ($SE_b = .19$), question $SD = 0.35$). This suggests that confidence may explain the variance observed in the *t* test results. The model results, coupled with the likelihood that the aggregate statistics show an artificial difference, suggest that my manipulation of perceived informativeness did not cause the withholding of coarse-grain information. In contrast, the regression coefficient indicated that confidence in coarse-grain information significantly predicted the withholding of coarse-grain information. Specifically, the more confident participants were in their coarse-grain information, the more likely they were to volunteer this information in their memory report. This finding offers support for the confidence mechanism within Koriat and Goldsmith's (1996) monitoring and control model. Combined with the results above, this suggests that some factor had an effect over and above confidence, contributing to coarse-grain withholding, but this factor does not appear to be my manipulation of perceived informativeness.

**Grain Size Choice**

In addition to determining whether perceived informativeness caused coarse-grain withholding, I also ascertained whether perceived informativeness affected grain size choice. As confidence in fine-grain information is thought to guide the grain size of memory reports (Goldsmith et al., 2005), I determined whether perceived informativeness affected grain size choice over and above the influence of fine-grain confidence. In the logistic mixed-effects model that I created to test this, phase three preferred responses was the outcome variable. I entered phase two (forced-report)

confidence in fine-grain information as the first predictor and the perceived informativeness manipulation as the second predictor. See Table 34 for model fit statistics and Table 35 for fixed effect coefficients.

Table 34

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in fine-grain information | 205.13 | 1 | <.001 |
| Perceived informativeness manipulation | 0.03 | 1 | .853 |

Table 35

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 0.95 | .14 | [0.68, 1.22] |
| Confidence in fine-grain information | -0.04 | .00 | [-0.05, -0.03] |
| Perceived informativeness manipulation | -0.03 | .17 | [-0.36, 0.30] |

*Note*. The model included question (*SD* = 0.23) as a random effect.

The regression coefficient indicated that my manipulation of perceived informativeness did not significantly predict grain size choice. This was consistent with the aggregate statistics. For the experimental group, mean proportion of preferred responses that were fine-grain was .35 (*SD* = .19). For the control group, the mean proportion of preferred responses that were fine-grain was .31 (*SD* = .18). This suggests that my manipulation of perceived informativeness did not affect grain size choice. The regression coefficient for confidence indicated that confidence in fine-grain information

significantly predicted grain size choice. Consistent with prediction and the monitoring and control model (Goldsmith et al., 2005), the more confident participants were in their fine-grain information, the more likely they were to select this fine-grain information as their preferred response. This not only offers confirmation for the monitoring and control model but also indicates that coarse-grain information was not withheld because the confidence mechanism within the monitoring and control model was flawed. It also suggests that a factor, not addressed in the model, is affecting grain size choice.

**Monitoring and Control**

Study 5b determined whether coarse-grain information was withheld because of perceptions of informativeness. I also ascertained whether this information was withheld through ineffective control. To establish this, I created a logistic mixed-effects model designed to assess monitoring ability. If participants were able to monitor successfully it would add credence to the idea that information is withheld through poor control rather than deficient monitoring. I entered phase two (forced-report) accuracy (for both fine and coarse-grain answers together) as the outcome variable and forced-report confidence (for both fine and coarse-grain answers) as the predictor. Confidence significantly improved the fit of the model, $\chi^2(1) = 35.18$, $p < .001$. Specifically, when confidence was high, so too was the probability that the response would be accurate, $b = 0.02$, $SE_b = .00$, 95% CI [0.01, 0.02], intercept $b = -1.11$ ($SE_b = .35$), item $SD = 1.04$. This suggests that, based on their confidence, participants were reasonably good at determining the likely accuracy of a piece of retrieved information. That is, participants were able to monitor successfully, providing support for the notion that the aspect of the monitoring and control model impacted during coarse-grain withholding, is control.

## Study 5c

I used an explicit instructional manipulation of perceived informativeness in Studies 5a and 5b. In both of these studies the benefits of coarse-grain information were

extensively listed and explained and examples provided. Both of these manipulations were unsuccessful. Neither manipulation was able to alter participants' perceptions of the informativeness of coarse-grain information.

Instructional manipulations that have the desired effect may be difficult to achieve. Telling people something is perhaps not as powerful as getting them to discover or deduce the same information themselves. Support for this comes from the experience based learning literature which states that adults need to learn experientially (Knowles, 1980). Accordingly, perhaps the manipulation of perceived informativeness would have been more successful had participants learnt the value of coarse-grain information for themselves. To test this, I manipulated perceived informativeness through a deductive reasoning task in Study 5c. Participants in the experimental condition were presented with information about seven suspects identified by the police. Participants were asked to rule out as many of the suspects as possible using the information the police knew about the suspects combined with their memory of what happened during the video. Participants were able to rule out five of the seven suspects using five pieces of crucial coarse-grain information. Colour was de-saturated from the stimulus video, making video content appear virtually black and white, to ensure that coarse-grain information would primarily be used to eliminate suspects. The act of ruling out suspects using coarse-grain details was designed to demonstrate the value of coarse-grain information to experimental group participants. It was expected that these participants would, in turn, perceive coarse-grain information to be more informative and would accordingly volunteer more (and withhold less) coarse-grain information and volunteer fewer fine-grain preferred responses, compared to participants in the control condition.

Extending the aims of Study 5a, I examined whether the withholding of coarse-grain information was generalizable. In Study 5a I tested this with two groups. One group was pre-exposed to numeric information about the robbery situation and the other group was

pre-exposed to colours of the clothing worn by the offenders. In Study 5c I included a third intermediate condition to examine whether participants withheld (1) pre-exposed information (the actual information (shades of colours) that they realised were valuable), (2) non pre-exposed but similar information (also shades of colours seen in the film but for new, not pre-exposed, items), or (3) non pre-exposed dissimilar information (information that was both new in content (not pre-exposed) and new in type (numeric items)).

Finally, I predicted that the aspect of the monitoring and control model affected during coarse-grain withholding, would be control. That is, participants would be able to monitor the accuracy of their retrieved information successfully.

## Method

### Participants

I recruited 80[20] participants (22 men, 57 women) from the Flinders University campus, the School of Psychology research participation system and the eyewitness laboratory email list. Average age of participants was 27.5 years (*SD* = 11.1). Participants were financially reimbursed or allocated course credit for their involvement.

### Design

A 2 (perceived informativeness: experimental, control) × 2 (pre-exposure: counter robber, door robber) between groups experimental design was used to ascertain whether perceived informativeness caused the withholding of coarse-grain information. Participants were randomly allocated to one of the four conditions.

### Experimental Manipulations

**Perceived informativeness.** Participants in the experimental group were informed that the police were trying to identify one of the robbers from the video. They were told

[20] One participant was excluded from analyses as he had participated in a previous study using the same stimulus video.

that the police had seven suspects and that they would receive a series of 10 verified facts about each of these suspects (see Appendix H). The participant's task was to rule out as many of these suspects as possible using the facts about the suspects and their knowledge of what happened during the video. Five of the facts were irrelevant details not seen in the stimulus video. This included the suspects' age, suburb of residence, occupation, marital status and presence of tattoos or other distinguishing marks. The other five facts were crucial pieces of information related to things seen in the video (colour of jacket etc.). Each crucial fact could rule out one of the seven suspects. For example, one crucial fact was the colour of the suspect's trousers. Six of the seven suspects were listed as wearing light coloured trousers (e.g., light blue, pale grey) while one of the seven suspects wore dark trousers (e.g., black). By combining these facts with their memory that the robber's trousers in the video were light, participants could deduce that the suspect wearing the black trousers must be innocent of the crime and as a result can be eliminated as a suspect.

For each suspect, experimental group participants recorded (1) whether they could eliminate this suspect (by circling either the yes or no response option), (2) the piece of information that allowed them to make this deduction (e.g., the trousers), and (3) the aspect of the information that allowed them to make the deduction (e.g., the offender's trousers were light but this suspect was wearing black trousers during the robbery). If participants did not justify their decision to eliminate a suspect, I prompted them to provide more information and expand on their reasoning.

Following this procedure, it was possible for participants to deduce that five of the seven suspects could be eliminated. These deductions were all made possible because of coarse-grain details (the light coloured trousers in the example above). Participants responded to the three items in the response booklet to ensure that they were aware that their coarse-grain information allowed them to make the deductions. I expected that

completing this task and making these deductions based on their coarse-grain information would demonstrate the value and importance of coarse-grain information to experimental group participants, increasing how informative these participants perceived coarse-grain information to be.

Participants in the control condition completed a different deduction task. I presented control group participants with the same 10 facts about the same seven suspects. However, control group participants were also given seven statements (see Appendix I). Each statement described an innocent suspect who had a verified alibi during the time the crime was committed. Control group participants were told that the police needed help eliminating suspects and that their task was to compare the facts with the statements and determine whether a suspect met the criteria of a statement. If they could establish that a statement described a particular suspect, this would indicate that this suspect had an alibi for the crime so could be eliminated as a suspect in the police investigation. The statements each contained five pieces of information. Each piece of information was related to an irrelevant fact that the police know about the suspects (age, residence, occupation, marital status and tattoos). Two of the seven statements were inconclusive; it was impossible to rule out a suspect based on the information provided. It was possible to rule out one suspect for each of the remaining five statements (the same five suspects that could be ruled out in the experimental deduction task). For example, one statement outlined a person who is 22 years old, lives in South Australia, is employed, not currently in a relationship and does not have tattoos. All of the suspects live in South Australia, all are employed, several are single and the majority do not have tattoos. However, only one suspect was 22 years old. In this case participants could deduce that this one suspect matches the statement. For every statement participants recorded (1) whether they could confirm that one of the suspects met the criteria of the statement (by circling either the yes or no response

option), (2) if a suspect met the statements' criteria, which suspect it was (here participants listed the name of the suspect), and (3) if a suspect met the statements' criteria, which piece of information allowed them to confirm this (here participants recorded that this suspect was the only 22 year old).

This task was used, rather than having participants complete an unrelated deductive reasoning or time filling task, for three reasons. First, I wanted to ensure that both the experimental and control group participants were exposed to the same information and spent a similar amount of time thinking about the crime. This would not have been possible with an unrelated control task. Second, I wanted to instruct control group participants on what they should do with the information. I wanted control group participants to be focused on a task to ensure that they did not coincidentally make the same deductions (value of coarse-grain information) as the experimental group. Finally, I wanted to ensure that any effect observed was attributable to the perceived informativeness of coarse-grain information and not merely the process of deductive reasoning. Thus, it was essential that the control group also completed a deduction task.

**Pre-exposure.** Participants were pre-exposed to information about the counter robber or the door robber through the deduction task. Participants in the counter robber condition were told that the police were focused on identifying the offender who stood at the counter during the robbery. They were told that the police had seven suspects who could be the counter robber. Participants in the door robber condition were told that the police were focused on identifying the robber who stood near the door during the robbery. They were told that the police had seven suspects who could be the door robber. The names of the suspects and the irrelevant details (date of birth, occupation, etc.) were the same in both groups. Only the crucial details differed between the two groups. Five details seen in the video about the counter robber (e.g., the shirt, trousers, hat, jacket and bag colours) were listed as the crucial details in the counter robber

condition. Five details seen in the video about the door robber (e.g., the car, trousers, beanie, jacket and bag colours) were listed as crucial details in the door robber condition. Pre-exposure items varied to increase the likelihood that any effect observed would not simply reflect idiosyncratic responses to specific questions.

**Materials**

**Stimulus video.** Study 5c required the use of a video in which fine-grain details could not be easily discriminated. This was necessary to ensure that participants relied on their coarse-grain information when completing the deductive reasoning task. I intended to use the dark video from Study 2. However, pilot results indicated that, after watching the Study 2 video, participants used a large number of fine-grain details when completing the deduction task. Therefore, I used a third version of the ANZ video in which it was even more difficult to discriminate fine-grain information. This version of the film was of similar darkness to the original (undoctored) version; however, colour was de-saturated to the extent that video content appeared virtually black and white.

I conducted a pilot study ($N$ = 10, 5 of whom were in the experimental group) to test this version of the ANZ video. Eighty percent of the experimental group participants used coarse-grain information to make deductions. Of this 80%, 75% used coarse-grain information more often than fine-grain information when making deductions.

**Grain size questionnaire.** The grain size questionnaire contained 15 items. Five questions asked for colours worn by the counter robber. Half of the participants were pre-exposed to these items during the deduction task. Five questions asked for colours worn by the door robber. The remaining participants were pre-exposed to these items during their deduction task. Five questions required numeric responses about the crime (e.g., robbery duration and number of staff members present). None of the numeric items were pre-exposed during the deduction task. Every participant answered all 15 questions.

I used this combination of 15 items for three reasons. First, this allowed me to examine withholding of pre-exposed information. Do participants volunteer particular coarse-grain colour information, after deducing the value of these particular coarse-grain items? Second, I investigated withholding of non pre-exposed similar items. Do participants generalise their deduced value of coarse-grain information and volunteer coarse-grain colour information that they were not pre-exposed to? Third, I examined the withholding of non pre-exposed dissimilar items. Do participants generalise the value of coarse-grain information and volunteer coarse-grain numeric information that they were not pre-exposed to? Grain size questions were presented in and answered the same way as Studies 5a and 5b.

**Manipulation check measure.** Study 5c used the same manipulation check measure as Studies 5a and 5b.

**Procedure**

Participants received verbal instructions outlining how the session would proceed before being randomly allocated to one of the four groups (experimental with pre-exposure to counter robber information, experimental with door robber pre-exposure, control with counter robber pre-exposure and control with door robber pre-exposure). Participants then read the introduction letter, completed the consent form, watched the stimulus video and completed the distracter task used in Studies 2-5b, in their laboratory cubicle. Following this, participants received a paper copy of the instructions and deduction task answer booklet for their condition. Participants received an A3 copy of the facts the police know about the seven suspects, according to their condition. Control group participants also received an A4 sheet containing the seven alibi related statements. Participants received paper copies of these documents and instructions, rather than presenting this information electronically, so that the information could be continually referred to when completing the task. After completion of the deduction

task, Study 5a and 5b procedure was followed. Participants completed the three phases of the grain size questionnaire using varying colours of ink before completing the concise perceived informativeness measure as a manipulation check.

## Results and Discussion

Eighteen answers (1.5% of all answers) were excluded from analyses as the fine-grain answer was correct and the coarse-grain answer incorrect. I also reverse scored all negatively worded perceived informativeness items. For every participant, I calculated pre-exposure to items. That is, I determined whether each question was pre-exposed, not pre-exposed or numeric.

### Manipulation Check

Consistent with Studies 5a and 5b, I determined whether I was able to successfully manipulate perceived informativeness. I expected that participants in the experimental group would deduce the value of coarse-grain information and would perceive and rate coarse-grain information as more informative compared to the control group. Again, I calculated a total perceived informativeness of coarse-grain information score for each participant, with possible scores ranging from 6-42. I then used an independent samples *t* test to establish whether this perceived informativeness score differed significantly between the experimental and control groups. Results suggested that the experimental ($M$ = 26.40, $SD$ = 4.15) and control ($M$ = 25.72, $SD$ = 6.57) groups did not differ significantly in their ratings of the perceived informativeness of coarse-grain information $t(63.87) = -0.55$, $p = .584$, $d = 0.14$, $d$ 95% CI [-0.31, 0.58], indicating that the manipulation was unsuccessful. However, again, the possibility that I successfully manipulated perceived informativeness, but the manipulation check measure was unable to detect this, must be noted.

Some experimental group participants did not base their deductions on coarse-grain information. Others used both coarse and fine-grain information when making their

deductions. Finally, some participants made incorrect deductions. Thus, I ran a series of additional independent samples *t* tests, on subsets of the data, to test whether the perceived informativeness manipulation was successful for people who completed the manipulation deduction task in the way that it was intended to be completed. I expected that once these participants were excluded, the experimental group would perceive and rate coarse-grain information as more informative compared to the control group. Again, I compared mean perceived informativeness scores between the two groups.

In the first additional *t* test, experimental group participants who did not use any coarse-grain information when making deductions were excluded from analyses ($N$ = 3). The second additional *t* test focused on participants who made at least one coarse-grain based deduction and no fine-grain based deductions. Twenty-two experimental group participants were excluded from this analysis. Finally, in the third additional *t* test, only participants who made at least one coarse-grain deduction and were accurate in their deductions, were included in analysis. Each of the seven deductions had a correct answer. Participants were considered accurate and remained in analysis if five or more of their seven deductions were correct. I excluded 30 experimental group participants from this analysis.

In all three additional *t* tests, there was no significant difference between the experimental and control groups in mean ratings of the perceived informativeness of coarse-grain information (see Table 36 for statistics). This suggests that the manipulation was unsuccessful, even when those who did not understand or did not complete the manipulation deduction task properly, were excluded from analyses.

Table 36

*Descriptive and Inferential Statistics from the Additional Independent Samples t Tests Conducted to Check the Manipulation Using Only Subsets of the Data*

| | Experimental group | | | Control group | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Included in analysis | *M* | *SD* | *N* included | *M* | *SD* | *N* included | *t* | *df* | *p* | *d* | *d* 95% CI |
| Participants who used some CG in deductions | 26.41 | 4.30 | 37 | 25.72 | 6.57 | 39 | -0.54 | 65.90 | .590 | 0.13 | [-0.32,0.58] |
| Participants who used some CG in deductions and didn't use any FG in deductions | 26.72 | 4.48 | 18 | 25.72 | 6.57 | 39 | -0.59 | 55 | .560 | 0.16 | [-0.40, 0.72] |
| Participants who used some CG in deductions and at least 5 of their deductions were correct | 26.20 | 3.88 | 10 | 25.72 | 6.57 | 39 | -0.22 | 47 | .826 | 0.06 | [-0.64, 0.75] |

**Withholding of Coarse-Grain Information**

Participants withheld 199 (17.1%) coarse-grain answers in Study 5c. I ascertained whether my manipulation of perceived informativeness predicted this withholding of coarse-grain information. In line with Studies 5a and 5b, I determined whether perceived informativeness affected coarse-grain withholding over and above the influence of confidence in coarse-grain information. I also established whether the perceived informativeness manipulation differed in its effect on coarse-grain withholding between pre-exposed items, not pre-exposed but similar items and not pre-exposed dissimilar items.

Again, I was only interested in instances where fine-grain information was withheld under free report, so I excluded all occurrences where fine-grain information was provided under free report, from the models. I entered withholding of coarse-grain information as the outcome variable and phase two (forced-report) confidence in coarse-grain information as the first predictor. I entered the perceived informativeness manipulation as the second predictor, pre-exposure to item as the third predictor and the interaction between pre-exposure and perceived informativeness as the fourth predictor. See Table 37 for model fit statistics and Table 38 for fixed effect coefficients.

Table 37

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in coarse-grain information | 460.63 | 1 | <.001 |
| Perceived informativeness manipulation | 2.38 | 1 | .123 |

| | | | |
|---|---|---|---|
| Pre-exposure to items | 0.63 | 2 | .728 |
| Perceived informativeness manipulation × pre-exposure to items | 3.23 | 2 | .199 |

Table 38

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Caused the Withholding of Coarse-Grain Information*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 2.90 | .29 | [2.30, 3.44] |
| Confidence in coarse-grain information | 0.08 | .01 | [0.07, 0.09] |
| Perceived informativeness manipulation | -0.20 | .37 | [-0.93, 0.52] |
| Non pre-exposed items* | -0.43 | .35 | [-1.12, 0.26] |
| Numeric items* | -0.28 | .37 | [-1.00, 0.45] |
| Perceived informativeness manipulation × non pre-exposed items* | 0.71 | .51 | [-0.28, 1.72] |
| Perceived informativeness manipulation × numeric items* | 0.88 | .54 | [-0.19, 1.93] |

*Note*. The model included question (*SD* = 0.15) as a random effect.

* Pre-exposed items was the reference condition.[21]

Inspection of the perceived informativeness regression coefficient indicated that my manipulation of perceived informativeness did not significantly predict the withholding of coarse-grain information. This was consistent with the aggregate statistics which indicated that the experimental group withheld an average of 2.35 (*SD* = 2.07) coarse-grain responses, compared to the control groups average of 2.69 (*SD* = 2.40) coarse-

[21] Essentially the three levels of pre-exposure were represented by dummy coding into two predictors (non pre-exposed versus pre-exposed and numeric versus pre-exposed).

grain responses. This indicates that my manipulation of perceived informativeness did not cause the withholding of coarse-grain information. The regression coefficients indicated that pre-exposure to item did not significantly predict coarse-grain withholding, indicating the withholding did not differ regardless of whether the information in the items were pre-exposed, not pre-exposed but similar or not pre-exposed and dissimilar. The interaction between perceived informativeness and pre-exposure was also not significant. This indicates that the extent to which perceived informativeness affected coarse-grain withholding did not differ significantly depending on pre-exposure. Table 39 demonstrates the actual amount of coarse-grain information withheld by the two groups, separated by pre-exposure. The confidence regression coefficient indicated that, as hypothesised, confidence did significantly predict the decision to report or withhold coarse-grain information. The more confidence participants had in their coarse-grain response, the more likely they were to volunteer this information in their memory report. Taken together, these findings suggest that confidence guided the decision to volunteer or withhold coarse-grain information. However, some coarse-grain information was still withheld for a reason. This reason was not perceived informativeness.

Table 39

*Mean Number of Coarse-Grain Answers Withheld by the Experimental and Control Groups, Separated by Pre-Exposure and Items*

| | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| Pre-exposed | Items | *M* | *SD* | *M* | *SD* |
| Yes | Counter robber | 1.00 | 1.21 | 0.47 | 0.61 |
| | Door robber | 1.15 | 0.88 | 1.15 | 1.35 |
| No | Counter robber | 1.15 | 1.31 | 1.40 | 1.50 |
| | Door robber | 0.80 | 1.01 | 1.00 | 1.16 |
| | Numeric[22] | 0.30 | 0.72 | 0.67 | 0.81 |

**Grain Size Choice**

In addition to investigating the withholding of coarse-grain information, I also ascertained whether perceived informativeness predicted grain size choice. In line with previous studies, I controlled for confidence in fine-grain information as Goldsmith et al. (2005) proposed that fine-grain confidence guides the grain size of memory reports. I also examined whether the effect of perceived informativeness on grain size choice differed depending on whether the grain size items contained pre-exposed information.

I constructed a logistic mixed-effects model to ascertain all of the above. I entered phase three preferred responses as the outcome variable, phase two (forced-report) confidence in fine-grain information as the first predictor, the perceived informativeness manipulation as the second predictor, pre-exposure to items as the third predictor and finally the interaction between the perceived informativeness manipulation and pre-

[22] Here, a *t* test revealed that the difference between the two means was significant. This was also the case when I ran the above model without controlling for confidence. Withholding of coarse-grain information was the outcome and I entered the perceived informativeness manipulation, followed by pre-exposure to item and the interaction between pre-exposure and perceived informativeness. The interaction improved the fit of the model, $\chi^2(2) = 6.57$, $p = .038$. Specifically, perceived informativeness differed in its effect on coarse-grain withholding between numeric and pre-exposed items $b = 1.02$, $SE_b = .43$, 95% CI [0.13, 1.83], intercept $b = 1.73$ ($SE_b = .30$), question $SD = 0.65$. This suggests that confidence explains the variance in the means revealed in the *t* test.

exposure to item as the fourth predictor. Model fit statistics are presented in Table 40 and fixed effect coefficients in Table 41.

Table 40

*Improvement in Fit for Addition of Predictors from the Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | $\chi^2$ | *df* | *p* |
|---|---|---|---|
| Confidence in fine-grain information | 249.78 | 1 | <.001 |
| Perceived informativeness manipulation | 0.45 | 1 | .501 |
| Pre-exposure to items | 0.61 | 2 | .737 |
| Perceived informativeness manipulation × pre-exposure to items | 0.23 | 2 | .230 |

Table 41

*Fixed Effect Coefficients for Saturated Logistic Mixed-Effects Model Investigating Whether Perceived Informativeness Affected Grain Size Choice*

| Fixed effect predictors | *b* | $SE_b$ | 95% CI |
|---|---|---|---|
| Intercept | 1.24 | .23 | [0.79, 1.69] |
| Confidence in fine-grain information | -0.04 | .00 | [-0.05, -0.04] |
| Perceived informativeness manipulation | 0.27 | .28 | [-0.28, 0.80] |
| Non pre-exposed items* | 0.32 | .27 | [-0.22, 0.85] |
| Numeric items* | 0.53 | .34 | [-0.17, 1.18] |
| Perceived informativeness manipulation × non pre-exposed items* | -0.45 | .39 | [-1.21, 0.32] |
| Perceived informativeness manipulation × numeric items* | -0.65 | .38 | [-1.37, 0.11] |

*Note*. The model included question (*SD* = 0.36) as a random effect.

* Pre-exposed items was the reference condition.

The regression coefficient indicated that my manipulation of perceived informativeness did not significantly predict grain size choice. Aggregate statistics also reflected this pattern. For the experimental group, the mean proportion of preferred responses that were fine-grain was .25 (*SD* = .15). In the control group, the mean proportion of preferred responses that were fine-grain was also .25 (*SD* = .17). This indicates that my manipulation of perceived informativeness did not affect grain size choice. In light of this finding, it was not surprising that pre-exposure to item and the interaction between pre-exposure and perceived informativeness did not significantly predict grain size choice. This signifies that grain size choice did not differ between pre-exposed, non pre-exposed similar and non pre-exposed dissimilar items. It also indicates that the effect of perceived informativeness on grain size choice did not differ depending on these different types of items. See Table 42 for the actual proportion of fine-grain preferred responses selected by the two groups, separated by pre-exposure. Finally, results indicated that confidence in fine-grain information significantly predicted grain size choice. Specifically, the more confident participants were in their fine-grain information, the more likely they were to volunteer this fine-grain information as their preferred response. This provides support for the confidence mechanism within the monitoring and control model (Goldsmith et al., 2005).

Table 42

*Mean Proportion of Fine-Grain Preferred Responses Selected by the Experimental and Control groups, Separated by Pre-exposure and Items*

| | | Experimental group | | Control group | |
|---|---|---|---|---|---|
| Pre-exposed | Items | *M* | *SD* | *M* | *SD* |
| Yes | Counter robber[23] | .13 | .18 | .33 | .25 |
| | Door robber | .31 | .23 | .25 | .30 |
| No | Counter robber | .23 | .21 | .18 | .16 |
| | Door robber | .30 | .30 | .34 | .27 |
| | Numeric | .27 | .31 | .20 | .22 |

**Monitoring and Control**

I predicted that perceived informativeness caused the withholding of coarse-grain information by affecting the process of control. To ascertain whether control was the aspect of the monitoring and control model affected during coarse-grain withholding, I tested monitoring ability. If participants were able to monitor the accuracy of their retrieved information successfully, it would indicate that coarse-grain information was not withheld through deficient monitoring, adding credence to the hypothesis that control is responsible for this behaviour.

I tested monitoring ability by generating a logistic mixed-effects model. I entered forced-report accuracy, for both fine and coarse-grain answers, as the outcome variable and confidence in fine and coarse-grain answers as the predictor. Confidence significantly improved the fit of the model $\chi^2(1) = 6.28$, $p = .012$. The regression coefficient indicated that confidence significantly predicted accuracy and that the more confident participants were in their responses, the more likely they were to be correct *b*

[23] A *t* test revealed this difference was significant. However, again, confidence and variation in item difficulty were not taken into consideration.

= 0.01, $SE_b$ = .00, 95% CI [0.00, 0.01], intercept $b$ = -0.78 ($SE_b$ = .33), item $SD$ = 1.21. This suggests that participants' ability to monitor was effective. That is, by determining their confidence in a piece of information, participants were reasonably good at gauging its likely accuracy. This provides support for the notion that coarse-grain information is withheld through ineffective control.

## General Discussion

Studies 5a-c were conducted to establish whether perceived informativeness causes the withholding of coarse-grain information. Ratings of the perceived informativeness of coarse-grain information did not significantly differ between the experimental and control groups in any of the three studies. No effect was found in Study 5c, even after I excluded participants who did not seem to understand, or were poor at or did not properly complete the deduction task designed to manipulate perceived informativeness. This suggests that the manipulations in all three studies were unsuccessful. However, across Studies 5a-c, the manipulation check measure was not applied in the way in which it was tested. I developed the manipulation check in Study 3 as a concise measure of perceived informativeness. I tested this measure in Study 4 to determine whether perceived informativeness predicted coarse-grain withholding. In Study 4, participants rated each one of their grain size answers on the perceived informativeness items. Alternatively, in Studies 5a-c, participants completed the measure only once, after answering all grain size questions. When used in this way, the perceived informativeness measure may not have been able to detect slight changes in perceptions, especially if these changes in perception differed between grain size answers. Consequently, it was possible that the manipulation did alter perceptions of the informativeness of coarse-grain information, but the manipulation check measure was unable to effectively detect this. Accordingly, I conducted and reported a full analysis of the data in each of the three studies. Across all three studies, results indicated that

perceived informativeness did not cause coarse-grain withholding or affected grain size choice. This result was consistent across pre-exposed and non pre-exposed items in Study 5a and pre-exposed items, non pre-exposed but similar items and non pre-exposed dissimilar items, in Study 5c. Confidence significantly predicted both accuracy and grain size choice in all of the studies. This garners support for the confidence mechanism of Koriat and Goldsmith's (1996) monitoring and control model and demonstrates that participants are able to monitor successfully.

The results from Studies 5a-c have important theoretical implications for the eyewitness memory report literature. These results corroborate Ackerman and Goldsmith's (2008), Brewer et al.'s (2014) and Yaniv and Foster's (1995) findings that coarse-grain information is sometimes withheld from memory reports. Further, these findings indicate how coarse-grain information is withheld. In all three studies, participants were able to successfully monitor the accuracy of their retrieved information. They were able to gauge their confidence in the response and this confidence significantly predicted their accuracy. This indicates that coarse-grain information is not withheld because of ineffective monitoring. Instead, it suggests that coarse-grain information may have been withheld because of defective control. That is, people may be withholding coarse-grain information by making a poor decision regarding what information should be volunteered in an eyewitness account. It is important that research establishes how information is withheld. The monitoring and control model is an important representation of the decision making process when reporting information, that is used in various fields (c.f. Arnold, Higham, & Martin-Luengo, 2013; Dobolyi & Dodson, 2013; Wong, Cramer, & Gallo, 2012). Studies 5a-c results and other findings in this thesis have garnered support for this model but importantly have also highlighted some boundaries of the model. Instances when the

model is unlikely to predict behaviour are now known, better equipping researchers in the field to apply the model.

The remainder of the theoretical implications to be drawn from Studies 5a-c differ depending on whether the manipulations were ineffective or the manipulation check inappropriate. If the manipulation was successful but the manipulation check inadequate, these results would suggest that perceived informativeness does not cause coarse-grain withholding. If this were the case it would suggest that while people may withhold coarse-grain information because they are motivated to be informative, their perceptions of what is informative do not affect reporting. Further, this would suggest that the correlational support for the hypothesis provided in Study 4 (perceived informativeness predicted coarse-grain withholding) was potentially the outcome of retrospective decision making. That is, perceived informativeness may not underlie coarse-grain withholding, as I originally hypothesised. Instead, participants may have used the perceived informativeness measure retrospectively to justify their decision to withhold information, explaining the result observed in Study 4.

Alternatively, and perhaps more likely, if the manipulations were unsuccessful, these results would demonstrate the difficulty associated with changing perceptions. Study 4 established that eyewitnesses were more likely to volunteer coarse-grain information when they perceived it to be informative. However Studies 5a-c demonstrated that these perceptions could not be controlled or altered and the nature of eyewitness memory reporting could not be changed. I attempted to manipulate perceived informativeness by using an explicit instructional manipulation that involved informing participants of how valuable coarse-grain information can be and illustrating this value with examples. When this appeared ineffective, I sought to manipulate perceived informativeness subtly by creating a task in which experimental group participants learnt or deduced the value of coarse-grain information themselves. Neither

approach appears to have been successful. There are still other potential manipulations of perceived informativeness worth pursuing, however, the possibility that perceptions of the informativeness of coarse-grain informative cannot be changed needs to be acknowledged. It can be difficult to change beliefs and beliefs often persist despite challenging evidence to the contrary (Davies, 1997). People may believe that, under most conditions, coarse-grain information is uninformative. They may maintain this belief despite information, examples and learning illustrating the opposite. If this were the case, it would suggest that coarse-grain information may be withheld because it is perceived to be uninformative, but these perceptions cannot be altered and the withholding of this valuable information is not easily prevented.

To my knowledge, this line of research has been the first to empirically investigate coarse-grain withholding. Across these studies, the only variable (apart from confidence) to show promise as a predictor of withholding was perceived informativeness. Study 4 discovered that perceived informativeness predicted coarse-grain withholding over and above the effect of confidence. It is therefore important that subsequent research continue to seek to manipulate perceived informativeness so that we can establish whether perceived informativeness causes coarse-grain withholding.

Subsequent research should build on, and address the limitations of, Studies 5a-c. The major limitation of these studies was the application of the perceived informativeness measure as a manipulation check. I tested this measure by getting participants to rate each of their grain size answers separately. However, in these three studies, participants rated all of their grain size answers (between 10-15 answers) on the one perceived informativeness measure. When used in this way, the perceived informativeness measure may not have been sensitive enough to detect changes in perceptions of informativeness and thus may have been unable to assess the effectiveness of the manipulation. In the future, if measures of perceived

informativeness are to be used as a manipulation check, they should be applied in the same manner in which they were tested. In this case, participants should complete the measure several times, after responding to each grain size question.

Subsequent research should also build upon the manipulations of perceived informativeness used in these studies. Studies 5a and 5b used explicit instructional manipulations which were seemingly ineffective. It was hypothesised that a manipulation may be more powerful if participants deduced the value of coarse-grain information on their own accord. Accordingly, perceived informativeness was manipulated, albeit seemingly unsuccessfully, through a subtle deduction task in Study 5c. This manipulation may have failed because the deduction task was too difficult and the value of coarse-grain information not prominent enough. The concept of getting participants to deduce the value of coarse-grain information is worth pursuing in subsequent research, perhaps using a less subtle task. It must also be noted that the encoding conditions in Studies 5a-c were optimal. Participants were able to see the content of the stimulus video clearly and the questions regarding the video content were completed almost immediately after the video was viewed. It is possible that participants could perceive coarse-grain information to be more informative if the fine-grain information was less accessible in their memories or retrieved with less confidence. Future research should consider manipulating perceptions of informativeness by varying encoding conditions and altering accessibility of, and confidence in, fine-grain information.

# CHAPTER 7

## Overall Discussion

Laboratory research indicates that coarse-grain information is sometimes withheld from eyewitness memory reports (e.g., Ackerman & Goldsmith, 2008; Brewer et al., 2014; Yaniv & Foster, 1995). As highlighted in Chapter 1, coarse-grain information can be valuable during some investigations and as part of the body of evidence in any subsequent trial. Coarse-grain information can guide and narrow an investigation and suspect search and can add to the evidence against a suspect by corroborating evidence acquired through other sources. The withholding of coarse-grain information from eyewitness memory reports is therefore potentially detrimental for the effective conduct of police investigations and ensuring a just outcome from any resulting court proceedings.

The memory reporting literature suggests that coarse-grain information may be withheld because people are motivated to be informative. The literature defines informativeness as the amount of detail conveyed (Goldsmith et al., 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995). That is, information is considered informative if it provides specific detail rather than a broad or coarse guide. Fine-grain information is more specific and thus more informative than coarse-grain information (Yaniv & Foster, 1995). Accordingly, coarse-grain information may be withheld because people have a preference for reporting fine-grain or specific information.

### Summary of Results

This preference for fine-grain information and specificity was investigated across seven studies. I examined the pervasiveness of this motivation for informativeness, identified how participants conceptualised informativeness and ascertained whether this preference for informativeness was fixed or, if under certain conditions, coarse-grain information would be reported. Study 1 investigated social motivation for specificity.

That is, I examined the effect of conditions considered to be socially motivating that might overcome the motivation to report purely fine-grain information. The results indicated that preference for specificity was resistant to changes in social context; social context did not overcome preference for specificity, demonstrating the strength of the motivation for informativeness. Study 2 tested the pervasiveness of this preference for specificity. I examined whether the preference for specificity still prevailed under circumstances in which specific or fine-grain information was likely to be less valuable than coarse-grain. Indeed, the preference for fine-grain information was resistant to unfavourable circumstances and participants continued to prefer fine-grain information, even when it was not adaptive. As Studies 1 and 2 did not produce the anticipated increases in coarse-grain reporting, I sought to understand how participants conceptualise informativeness, expecting that this may help explain their preference for fine-grain information. Accordingly, in Study 3, I developed a measure of perceptions of informativeness and, in Study 4, ascertained whether perceptions of informativeness predicted memory reporting. Results indicated that perceptions of informativeness included judgements not only of specificity but also of value and image. Further, these perceptions significantly predicted coarse-grain withholding and grain size choice. Coarse-grain information was more likely to be volunteered and selected as the preferred response when this information was perceived to be informative, specific, valuable and beneficial for the individual's image. Finally, Studies 5a-c tested several manipulations designed to encourage recognition of when coarse-grain information would be useful to ascertain whether the nature of eyewitness memory reporting could be changed. I was unable to evoke such changes, with eyewitnesses resisting the manipulations and clearly prioritising fine-grain information. In addition to investigating why coarse-grain information is withheld, I also established how it is

withheld. Results across all studies in this thesis[24] indicated that participants were able to successfully monitor the accuracy of their retrieved information. This suggests that coarse-grain information was not withheld through defective monitoring, indicating that perhaps ineffective control was responsible for this behaviour.

While I was unable to bring the reporting of coarse-grain information under experimental control, Study 4 provided evidence that perceptions of informativeness affect coarse-grain withholding. Further, perceived informativeness seems to affect reporting through impeding the process of control. That is, in addition to determining their confidence in, and likely accuracy of, a piece of information, people may also determine how informative they believe the information to be. In some cases, people may choose to withhold coarse-grain information, based on these perceptions of informativeness, regardless of confidence and likely accuracy.

**Theoretical Implications**

The findings from these studies have important consequences for the memory report literature. Most noteworthy, the research in this thesis identified why coarse-grain information is at times withheld from eyewitness memory reports. Study 2 results indicated that participants withheld coarse-grain information because they were motivated to be informative. Further, Study 4 results indicated that individual perceptions of this informativeness predicted reporting behaviour.

The link between fine-grain information and informativeness is discussed in the memory report literature. The literature defines informativeness in terms of specificity (Goldsmith et al., 2005; Weber & Brewer, 2008; Yaniv & Foster, 1995), with fine-grain information more specific than coarse-grain information (Yaniv & Foster, 1995). Accordingly, a preference for reporting fine-grain information corresponds with a preference for informativeness. However, prior to Study 2 of this thesis, research had

[24] This excludes Study 3 which did not investigate confidence, grain size choice or coarse-grain withholding.

yet to ascertain whether this preference for informativeness was responsible for the withholding of coarse-grain information. Study 2 results therefore provided empirical evidence that preference for fine-grain information does underlie the withholding of coarse-grain information.

As outlined above, Study 4 results provided correlational evidence that coarse-grain information is withheld because of perceived informativeness, with perceptions of informativeness comprised of judgements of specificity, value and image (Study 3). These findings provide insights into this problematic behaviour of coarse-grain withholding in eyewitnesses. These findings also promote greater understanding of the various judgements that are made when determining whether a piece of information is informative and highlight which of these judgements predict reporting behaviour. They suggest that the 'specificity' focused conceptualisation of informativeness in the literature need to be revised. Study 3 results suggest that informativeness also refers to value and image. Accordingly, the literature needs to take a broader perspective when conceptualising informativeness and the various perceptions of informativeness, identified through this research, should be included in the definition and conceptualisation of the construct.

Prior to this research, little was known about coarse-grain withholding. This thesis extends understanding and knowledge of the withholding of coarse-grain information by demonstrating the strength and pervasiveness of fine-grain reporting preferences. Study 1 results suggest that the preference for informativeness is resistant to variations in social context. Further, Study 2 results demonstrate that this preference persists, even in situations when other more valuable information is available.

In addition to establishing why coarse-grain information is withheld, this thesis also provides evidence of how it is withheld. Koriat and Goldsmith (1996) proposed that the decision to report or withhold information is made through the processes of memorial

monitoring and control. Monitoring is the ability to determine the likely accuracy of a piece of information and control is the decision to report or withhold this information (Koriat & Goldsmith, 1996). Koriat and Goldsmith's model proposes that people will retrieve their best candidate fine-grain answer and will assess the likely accuracy of this response by gauging their confidence in the information. If the accuracy likelihood meets a pre-set threshold, the fine-grain answer will be volunteered; if not, a coarse-grain answer will be retrieved and provided instead.

Results across all studies in this thesis indicated that participants' confidence significantly predicted their reporting decision and the grain size of their responses. Further, participants were able to successfully monitor the accuracy of their retrieved information. This suggests that participants did not withhold coarse-grain information because of poor confidence estimation or deficient monitoring. Instead, these findings indicate that coarse-grain information was perhaps withheld through ineffective control. That is, perceptions of informativeness may have affected reporting via the process of control. This provides the memory reporting literature with understanding of some of the boundary conditions of the monitoring and control model. It indicates when the model is unable to predict behaviour and why the model is unable to predict this behaviour. This also suggests that perhaps the monitoring and control model should be expanded to include the effect of perceptions of informativeness on reporting and control.

Study 4 results indicated that perceptions of informativeness vary and are related to memory reporting. However, Studies 5a-c demonstrated the difficulty associated with making global changes in people's perceptions of coarse-grain information. It must be noted that this general bias against coarse-grain information may not be changeable. As Davies (1997) remarked, beliefs can be extremely persistent. People often maintain beliefs despite evidence to the contrary. Accordingly, in some situations people may

perceive coarse-grain information to be informative. In these situations they may volunteer this coarse-grain information in their memory report. However, in all other situations people may have a bias against reporting coarse-grain information. While we may be able to adjust perceptions of informativeness in occasional situations and under certain conditions, we may be unable to change the underlying belief that reporting coarse-grain information involves providing information that is non-specific, valueless and detrimental to one's image. Consequently, we may know why and how coarse-grain information is withheld, but may be incapable of changing how eyewitnesses generally view coarse-grain information. In turn, we may be unable to prevent eyewitnesses from withholding this valuable information from their memory reports.

**Practical Consequences**

This line of research has practical consequences for the procedures used to obtain information and statements from eyewitnesses of crime. Coarse-grain information is often accurate and has the potential to be very valuable in a police investigation. A coarse-grain detail could narrow the search field in a police inquiry, could add to the evidence against the suspect and could aid the prosecution in securing a guilty verdict.

Between 9 and 17% of coarse-grain answers were withheld across the studies of this thesis. Of these withheld coarse-grain responses, between 59 and 67% were correct. Further, some of the inaccurate details withheld could also have proved valuable in terms of guiding investigations. An answer may not be strictly accurate but may be similar and close to the accurate response so may guide investigators towards the correct direction. For example, an eyewitness may report that the offender drove a pale coloured car. In reality, the offender's car may have been a medium shade of grey. In this situation, the eyewitness is officially incorrect; however, the coarse-grain information within their memory report has correctly narrowed the police departments search by excluding owners of dark coloured vehicles.

It must be noted, of course, that the rates of coarse-grain withholding reported in this thesis are specific to the stimuli and number of items used in these studies. For example, more coarse-grain information was withheld in Study 5c where the viewing conditions were poorer. In turn, the rate of coarse-grain withholding observed in this thesis cannot be used as a gauge of the prevalence of this behaviour in all cases and under all conditions. It is conceivable, though, that coarse-grain withholding may be more commonplace during an actual investigation. Research indicates that people possess greater concern with image when in the presence of authority (Lowenstein et al., 2010). The motivation to be specific is also heightened when reporting information to an authority figure (Dudukovic et al., 2004; Hyman, 1994). In sum, compared to a laboratory setting, people may be more concerned with providing a positive image and volunteering specific information, when reporting to a police officer during a real investigation. This increased concern with being informative could conceivably exacerbate the bias towards fine-grain information and lead to more coarse-grain withholding during a real investigation.

Coarse-grain information may often be valuable and important and the withholding of this type of information is potentially common, possibly affecting many police investigations. Mock eyewitnesses in the laboratory setting at times withhold coarse-grain information from their memory reports because they are motivated to be informative and they do not like to volunteer information that they perceive to be uninformative. It seems likely that this phenomenon would be replicated with eyewitnesses to real crimes. Now that it has been established why eyewitnesses sometimes withhold coarse-grain information, it is important that research identifies how perceptions of informativeness can be controlled. Following this, methods for extracting information that directly target perceived informativeness as the underlying reason for withholding can be designed and tested. Conceptualising and testing these

alternatives is important so that coarse-grain withholding can be reduced in occurrence. Achieving this will ensure that the police have access to as much information as possible when investigating crimes, to increase the odds that cases are solved.

**Future Research**

From a research standpoint, there are two major issues worthy of attention. First, uncovering why eyewitnesses withhold coarse-grain information from their memory reports is important. Second, interviewing techniques that target the reasons why coarse-grain information is withheld need to be designed and tested in order to reduce this behaviour. The research in this thesis has addressed the first aspect of this issue. This research has provided clear evidence that eyewitnesses withhold coarse-grain information because they have a preference for reporting fine-grain information and are motivated to be informative. Further, this research provides correlation evidence that informativeness is based on individual perceptions; largely shaped by judgements of the specificity and value of the information as well as how reporting the information would affect the individual's image. Subsequent research should strive to successfully manipulate perceived informativeness. Achieving this would provide an experimental demonstration that perceived informativeness causes the withholding of coarse-grain information and, of course, would point to possible mechanisms for overcoming the problem. Subsequent research could build upon the perceived informativeness manipulations used in Studies 5a-c. Studies 5a and 5b attempted to manipulate perceptions of informativeness using explicit instructions. In these studies, the benefits of coarse-grain information were extensively listed and explained, and examples provided, in an attempt to change the way that participants viewed coarse-grain information. Both manipulations were unsuccessful. It was hypothesised that a manipulation may be more powerful if participants deduced the value of coarse-grain information on their own accord. Consequently, perceived informativeness was

manipulated through a subtle deduction task in Study 5c. Participants were provided with a series of facts about seven suspects and were told to help the police by ruling out as many of these suspects as possible using the information provided and their memory of what happened during the bank robbery depicted in the stimulus video. Colour was removed from the stimulus video to ensure that participants relied on their coarse-grain information when making the deductions. It was expected that when completing the deduction task, participants would learn the value of coarse-grain information, reducing their bias against coarse-grain information. Again, this manipulation was unsuccessful. This manipulation may have failed because the deduction task was too difficult and the value of coarse-grain information not prominent enough. Consequently, the concept of getting participants to deduce the value of coarse-grain information is potentially worth pursuing, but perhaps using a less subtle task. Alternatively, a new manipulation could be devised. Perhaps, a situation could be created whereby each participant is led to believe that their coarse-grain information is the only information that could solve a case.

Once the cause of coarse-grain information withholding has been firmly established, research should move towards the practice of eyewitness interviewing. Specifically, alternative methods for obtaining information from eyewitnesses should be developed. If perceived informativeness is found to cause coarse-grain withholding, these alternative methods should focus on perceived informativeness. That is, the alternative methods will need to change peoples' perceptions of coarse-grain information to increase the frequency with which this information is reported. These perceived informativeness focused methods of information extraction will possibly be guided by the successful manipulation of perceived informativeness. The successful manipulation would have been a success because it was able to adjust or control people's perceptions of informativeness. These principles can then be applied when developing techniques to

prevent this behaviour. For example, should perceived informativeness be successfully manipulated by creating a situation whereby participants believe that only their coarse-grain information can solve the case, perhaps a similar situation should be created when interviewing eyewitnesses to increase coarse-grain reporting. Once alternative methods of eyewitness interviewing have been developed, they will need to be extensively tested to ascertain which method is most effective at reducing coarse-grain withholding. The most effective method should then be applied to investigative interviewing protocols to reduce this behaviour in eyewitnesses to minimise the detrimental impact that the withholding of coarse-grain information has on the criminal justice system.

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**Appendix A**

## PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY.

**The video you watched earlier in the session showed a bank robbery**

**Please answer ALL the following questions about the video you saw earlier in the session**

**For each question you will be asked to give 2 responses**

One answer will be a very specific detail – for example “sky blue” as a response to “what colour?”

The other answer will be a broader detail – for example “light” as a response to “what colour?”

**Make sure you read each question carefully because the two types of responses won’t be in the same order for each question**

**For each answer there is a confidence scale going from 0% (very very unsure) to 100% (very very sure)**

**For each answer please circle how sure you are that the response you just wrote is correct**

Here are some examples:

*What colour were the walls in the bank?*

Exact colour — white

**How sure are you that your response is correct? (Please circle)**

0% Very Very Unsure | 10% | (20%) | 30% | 40% | 50% Half Sure | 60% | 70% | 80% | 90% | 100% Very Very Sure

General colour (light, medium, dark) — light

**How sure are you that your response is correct? (Please circle)**

0% Very Very Unsure | 10% | 20% | 30% | 40% | 50% Half Sure | 60% | 70% | (80%) | 90% | 100% Very Very Sure

*How many people were in the bank during the robbery?*

Between (range) — 4 and 8

**How sure are you that your response is correct? (Please circle)**

0% Very Very Unsure | 10% | 20% | 30% | 40% | (50%) Half Sure | 60% | 70% | 80% | 90% | 100% Very Very Sure

Exact — 6

**How sure are you that your response is correct? (Please circle)**

0% Very Very Unsure | (10%) | 20% | 30% | 40% | 50% Half Sure | 60% | 70% | 80% | 90% | 100% Very Very Sure

There are 20 questions

After you finish answering ALL the questions open your door
Nicole will explain what you need to do next

Just remember to answer ALL the questions about the video and circle how sure you are that your responses are correct

If you have any questions open your door and ask Nicole

# Appendix B

| FACTOR & EXPLANATION | EXAMPLES |
|---|---|
| **Accuracy**<br>(Any mention of accuracy/inaccuracy, correctness/incorrectness, getting the information/answers right etc.) | I wanted to be accurate.<br>I was concerned with being correct.<br>I wanted to get the answers right.<br>I wanted to give the right information. |
| **Confidence**<br>(Any reference to confidence, certainty/uncertainty, being sure/unsure etc. Mention of confidence increments of the questionnaire should be coded as stimuli *not* confidence.) | My confidence in the answer.<br>I was certain.<br>I was not very confident.<br>I was unsure. |
| **Informativeness**<br>(Any reference to wanting to be informative, provide detail, be specific etc.) | I wanted to be informative.<br>I was concerned with providing detail.<br>I wanted to give specific answers and information. |
| **Evaluation**<br>(Any reference to having answers/responses scored, marked or evaluated or mention of being judged based on responses.) | I thought my answers would be scored.<br>I was concerned about my responses being evaluated. |
| **Audience**<br>(Any mention of who would be scoring the answers/making the evaluations or who would use or see the answers – whether it be the researcher, the police/authority, someone else or a general reference to the 'scorer' or 'assessor'. Also include any mention of researcher expectations. This includes wanting to fulfil the researchers expectations, anticipating what the researchers expectations are etc.) | I was concerned with who would be scoring my answers.<br>I thought the researcher would mark my responses.<br>I wanted to give the researcher the information they wanted to hear. |
| **Privacy**<br>(Any mention of the fact that the study was completed individually, when alone, in private cubicles. Any reference to being alone, anonymity, not being able to be linked to answers, privacy, not in public, not in a group.) | I was in private.<br>I was not in public.<br>My answers were anonymous and could not be linked to me. |
| **Memory**<br>(Anything that refers to memory, remembering, recalling, recollecting etc. Include any reference to observations<br>(what they observed, saw, viewed etc.) or visualisation (what they visualised, pictured, mentally recreated etc.) as the participant is remembering what they observed and is using their memory to visualise what they saw.) | What I could remember.<br>My memory for the video.<br>My responses were shaped by what I saw.<br>I made a mental image of what I had seen and then answered the questions using my mental image. |
| **Participant Factors**<br>(Any reference to factors about the participant. Include situational factors, personality factors, contextual factors affecting the individual and thoughts/feelings etc within the individual. Participant factors include but are not limited to: stress, fatigue/alertness, concentration/focus (looking for something)/attention, comfort, | I was stressed out when doing the questionnaire.<br>I didn't get much sleep last night so was pretty tired and couldn't concentrate very well.<br>The headphones were uncomfortable.<br>My reaction time was slow.<br>What I paid attention to. |

| | |
|---|---|
| nervousness, reaction time, distracted, doubt, perceived pressure (not time pressure – this should be coded as task), knowledge and worry. Include any reference to previous eyewitness research participation.) | I was looking for what clothes they wore.<br>I've done eyewitness studies before so I knew it would be hard. |
| **Image**<br>(Any reference to image concern, whether it be wanting to be liked, wanting to impress, wanting to be perceived as intelligent, concern with how answers would reflect on the participant etc. Include any reference to the desire to do well, succeed, the desire to help, the desire to tell the truth etc. This is different to accuracy. This is the desire to do well and accuracy is the desire to be right.) | I wanted to be likeable.<br>I wanted to impress.<br>I was concerned with how answers would reflect on me.<br>I wanted to do well.<br>I wanted to help.<br>I wanted to tell the truth/be honest. |
| **Guessing**<br>(Any reference to guessing (estimating, speculating etc.), stereotypes (common sense, expectations, assumptions etc.) or instinct (knowing, sensing, feeling etc.) as basing answers on stereotypes or instinct is essentially a guess as answers are not based on memory for events. | I guessed some of the answers.<br>Robbers usually wear dark clothes/don't usually wear bright clothes so I recorded my answers around this.<br>Not many cars are purple so I didn't write purple, I picked a common car colour.<br>I knew the guy was wearing jeans. I couldn't remember the colour but most jeans are blue so I said blue.<br>What I perceived a robber to wear using past experiences.<br>I had a sense of faith in what was in my memory.<br>What I 'knew'. |
| **Real Life**<br>(Any mention of a real life witness situation. Includes mention of thinking about real life crimes and what the participant would do if this was real, wanting to be a good witness, wanting to catch the offender, wanting to give the police information and focusing attention on things that would be important in a bank robbery such as remembering the scene of the crime and details of the offenders. The participant can mention it as though they think of the experiment as a real life crime or they can mention it as though it made them think about what would happen if this was real. Also include if they make the point that the experiment is different from a real life crime.) | I thought about what I would do if this was a real crime and I was a real witness.<br>I wanted to give good information to the police so that the robbers could be captured.<br>I purposely took note of things that are important during a robbery. I focused on things like the details of the robbers and the crime scene.<br>This is different to a real bank robbery. |
| **Task & Stimuli**<br>(Any mention of the task (not knowing/knowing what the experiment would involve or the purpose of the task/study, what to look for, what Qs would ask etc.), time limit of the task (time or time constraints, half an hour to do the task, running out of time, having to finish within the time limit, having to be quick) or stimuli – film (colour/lack of colour the film, duration/length, size or quality of the | Not knowing what the task involved.<br>Not knowing what questions would be asked.<br>The time limit made me rush.<br>The video had no colour, it was black or white, so I could not see the colours.<br>The question prompts (light, medium, dark).<br>The 'don't know' option was good. It meant that I could just answer the questions I knew the answer to.<br>The word search distracted me. |

| | |
|---|---|
| film, camera angles etc.), questionnaire (questionnaire, questions, what the questions were about, example questions, question prompts, the ease/difficulty of the questions, the questionnaire format, the questionnaire phases and the don't know option) filler task (word find, word search, crossword, mazes etc. The filler task was distracting, confusing, annoying, seemed odd or seemed out of place.) | |
| **Grain Size**<br>(Any reference to the distinction between colours and shades. Must mention the distinction between the two, can't just mention a colour or a shade. However, if they imply either shade or colour code is as grain size choice. E.g., I thought about shades more or I put down colours more. The use of 'more' implies a distinction between the two. Include the distinction between fine and coarse-grain information, the distinction between broad and specific information, the order in which they retrieved the different types of information etc.) | I recalled the colour first then thought about what shade it was.<br>First I recalled the broad answer then thought about all of the possible specific answers it could be.<br>I remembered colours more. |
| **Other/Miscellaneous**<br>(Any mention of anything not covered by the other categories. Like all categorisations, break the factor down into its separate parts. If a part doesn't fit anywhere else code it as other.) | I didn't want to put the same answer for everything.<br>Probability. |

## Appendix C

Reliability Analysis Results Separated for Item and Grain Size for the Extended Perceived Informativeness Measure

Table C1

*Internal Consistency of the Extended Perceived Informativeness Measure*

| | Reliability analysis | | | |
|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question two coarse-grain | Question two fine-grain |
| $\alpha$ | .90 (23 items) | .89 (23 items) | .93 (23 items) | .94 (23 items) |

Table C2

*Internal Consistency of the Subscales of the Extended Perceived Informativeness Measure*

| | Subscales | | | |
|---|---|---|---|---|
| Reliability analysis | Value | Image | Specificity | Accuracy |
| Question one coarse-grain | .91 | .69 | .45 | .48 |
| Question one fine-grain | .88 | .58 | .58 | .64 |
| Question two coarse-grain | .92 | .76 | .71 | .70 |
| Question two fine-grain | .91 | .75 | .73 | .78 |

## Appendix D

Validity Analysis Results Separated for Item and Grain Size for the Extended Perceived Informativeness Measure

Table D1

*Discriminant Validity of the Extended Perceived Informativeness Measure for Question One and Two Separately*

| Question | Fine-grain *M* (*SD*) | Coarse-grain *M* (*SD*) | *t* | *p* | *d* | *d* 95% CI |
|---|---|---|---|---|---|---|
| One | 116.63 (18.89) | 104.63 (20.86) | 6.07 | <.001 | 0.60 | [0.37, 0.84] |
| Two | 115.19 (23.83) | 104.16 (24.66) | 5.69 | <.001 | 0.45 | [0.22, 0.68] |

Table D2

*Discriminant Validity of the Subscales of the Extended Perceived Informativeness Measure for Question One and Two Separately*

| | | Fine-grain | Coarse-grain | | | | |
|---|---|---|---|---|---|---|---|
| Question | Subscale | *M* *(SD)* | *M* *(SD)* | *t* | *p* | *d* | *d* 95% CI |
| One | Value | 43.45 (8.65) | 39.32 (10.31) | 5.19 | <.001 | 0.43 | [0.13, 0.66] |
| | Image | 34.53 (5.60) | 30.57 (6.62) | 6.19 | < .001 | 0.64 | [0.41, 0.88] |
| | Specificity | 20.11 (4.17) | 15.85 (4.25) | 8.72 | < .001 | 1.01 | [0.77, 1.25] |
| | Accuracy | 18.31 (4.39) | 18.73 (3.82) | -1.17 | .246 | -0.10 | [-0.33, 0.12] |
| Two | Value | 43.03 (9.68) | 38.66 (10.98) | 5.41 | < .001 | 0.42 | [0.19, 0.65] |
| | Image | 34.17 (7.03) | 31.00 (7.44) | 5.13 | < .001 | 0.44 | [0.21, 0.67] |

| | | | | | | |
|---|---|---|---|---|---|---|
| Specificity | 19.81 (5.09) | 16.03 (5.19) | 8.11 | < .001 | 0.73 | [0.50, 0.97] |
| Accuracy | 18.06 (5.43) | 18.39 (4.62) | -0.86 | .394 | -0.07 | [-0.29, 0.16] |

# Appendix E

Principle Components Analysis

Table E1

*Percentage Variance Explained By Each Component in Each PCA*

| | PCA | | | |
|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question one coarse-grain | Question one fine-grain |
| Factor 1 | 25.83% | 22.19% | 24.26% | 33.15% |
| Factor 2 | 18.91% | 17.17% | 22.25% | 21.54% |
| Factor 3 | 10.32% | 15.59% | 17.33% | |
| Total | 55.07% | 54.95% | 63.84% | 54.69% |

Table E2

*Factors That Emerged From the PCAs and the Items That Loaded onto Each Factor*

| Factor | PCA | | | |
|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question two coarse-grain | Question two fine-grain |
| One | Unhelpful | Relevant | Unhelpful | Relevant |
| | Beneficial | Useful | Beneficial | Uncertain |
| | Fascinating | Uninteresting | Vague | Useful |
| | Worthless | Add knowledge | Fascinating | Wrong |
| | Unimportant | Unhelpful | Worthless | Uninteresting |
| | Relevant | Too general | Unimportant | Inaccurate |
| | Uninteresting | Value | Relevant | Add knowledge |
| | Valuable | Worthless | Uninteresting | Unintelligent |
| | Observant | Vague | Valuable | Unhelpful |
| | Add knowledge | Unimportant | Observant | Incompetent |
| | Precise | Detailed | Add knowledge | Too general |
| | Useful | Beneficial | Useful | Valuable |
| | Detailed | | | Worthless |
| | | | | Vague |
| | | | | Unimportant |
| | | | | Beneficial |
| Two | Unhelpful | Observant | Too general | Observant |
| | Incompetent | Precise | Unhelpful | Precise |
| | Vague | True | Incompetent | True |
| | Wrong | Fascinating | Vague | Fascinating |
| | Worthless | Confident | Wrong | Confident |
| | Unimportant | Correct | Worthless | Correct |
| | Uninteresting | Detailed | Unimportant | Detailed |
| | Inaccurate | | Uninteresting | Beneficial |
| | Uncertain | | Inaccurate | |
| | Unintelligent | | Uncertain | |
| | | | Unintelligent | |
| Three | Too general | Uncertain | Correct | |
| | Correct | Wrong | Confident | |

| | | |
|---|---|---|
| Confident | Inaccurate | Detailed |
| Precise | Unintelligent | Observant |
| True | Incompetent | Precise |
| | Worthless | Uncertain |
| | Vague | True |

## Appendix F

Reliability Analysis Results Separated for Item and Grain Size for the Concise Perceived Informativeness Measure

Table F1

*Internal Consistency of the Concise Perceived Informativeness Measure*

| | Reliability Analysis | | | |
|---|---|---|---|---|
| | Question one coarse-grain | Question one fine-grain | Question two coarse-grain | Question two fine-grain |
| $\alpha$ | .79 (6 items) | .65 (6 items) | .85 (6 items) | .80 (6 items) |

Table F2

*Internal Consistency of the Subscales of the Concise Perceived Informativeness Measure*

| | Subscales | | |
|---|---|---|---|
| Reliability analysis | Value | Image | Specificity |
| Question one coarse-grain | .91 | .54 | .15 |
| Question one fine-grain | .67 | .12 | .23 |
| Question two coarse-grain | .87 | .59 | .57 |
| Question two fine-grain | .79 | .66 | .41 |

# Appendix G

Validity Analysis Results Separated for Item and Grain Size for the Concise Perceived Informativeness Measure

Table G1

*Discriminant Validity of the Concise Perceived Informativeness Measure for Question One and Two Separately*

| Question | Fine-grain *M* (*SD*) | Coarse-grain *M* (*SD*) | *t* | *p* | *d* | *d* 95% CI |
|---|---|---|---|---|---|---|
| One | 30.88 (5.54) | 26.82 (6.95) | 6.32 | <.001 | 0.64 | [0.41, 0.87] |
| Two | 30.47 (6.98) | 26.74 (7.87) | 6.17 | <.001 | 0.50 | [0.27, 0.73] |

Table G2

*Discriminant Validity of the Subscales of the Concise Perceived Informativeness Measure for Question One and Two Separately*

| Question | Subscale | Fine-grain *M* (*SD*) | Coarse-grain *M* (*SD*) | *t* | *p* | *d* | *d* 95% CI |
|---|---|---|---|---|---|---|---|
| One | Value | 10.71 (2.47) | 9.64 (3.01) | 4.32 | <.001 | 0.39 | [0.16, 0.62] |
| | Image | 10.33 (2.39) | 9.41 (2.82) | 3.71 | < .001 | 0.35 | [0.12, 0.58] |
| | Specificity | 9.83 (2.28) | 7.77 (2.53) | 7.52 | < .001 | 0.86 | [0.62, 1.10] |
| Two | Value | 10.48 (2.89) | 9.45 (3.07) | 3.96 | < .001 | 0.35 | [0.12, 0.57] |
| | Image | 10.35 (2.75) | 9.32 (3.03) | 4.75 | < .001 | 0.36 | [0.13, 0.58] |
| | Specificity | 9.66 (2.75) | 8.00 (2.94) | 6.54 | < .001 | 0.58 | [0.35, 0.81] |

# Appendix H

## INFORMATION THE POLICE KNOW ABOUT THE SUSPECTS FOR ROBBER AT COUNTER

| | **Joshua Brown** | **Luke Brennan** | **Chris Gilbert** | **Stewart Jones** | **Shaun Nance** | **Andrew Burns** | **Michael Ayton** |
|---|---|---|---|---|---|---|---|
| **Age** | 22 | 25 | 25 | 23 | 21 | 21 | 24 |
| **Suspect Suburb of Residence** | St Marys | Warradale | Happy Valley | Edwardstown | Pasadena | Seacliff | Richmond |
| **Occupation** | Chef | Service Station Attendant | Public Relations Officer | Web Developer | Apprentice Plumber | Mechanic | Real Estate Agent |
| **Relationship Status** | Single | Has Girlfriend | Married | Single | Has Girlfriend | Single | In Defacto Relationship |
| **Colour of Shirt Suspect Wore on Day of Crime** | Light Purple | Pale Blue | Light Grey | Pale Grey | Pale Purple | Light Blue | Black |
| **Colour of Pants Suspect Wore on Day of Crime** | Light Blue | Pale Blue | Black | Pale Grey | Pale Blue | Light Blue | Light Grey |
| **Colour of Hat Found at Suspects Residence** | Cream | White | Beige | Off White | Navy Blue | Light Grey | Cream |
| **Colour of Jacket Worn by Suspect on Day of Crime** | White | Brown | Dark Brown | Chocolate Brown | Dark Grey | Dark Brown | Charcoal |
| **Colour of Bag Owned by Suspect** | Yellow | Khaki | Beige | Light Brown | Beige | Black | Yellow/Brown |
| **Tattoos and Distinguishing Marks** | None | Southern Cross Tattoo on Right Shoulder | Chinese Symbol Tattoo on Chest | None | Large Abdominal Scar | None | None |

## INFORMATION THE POLICE KNOW ABOUT THE SUSPECTS FOR ROBBER AT DOOR

| | **Joshua Brown** | **Luke Brennan** | **Chris Gilbert** | **Stewart Jones** | **Shaun Nance** | **Andrew Burns** | **Michael Ayton** |
|---|---|---|---|---|---|---|---|
| **Age** | 22 | 25 | 25 | 23 | 21 | 21 | 24 |
| **Suspect Suburb of Residence** | St Marys | Warradale | Happy Valley | Edwardstown | Pasadena | Seacliff | Richmond |
| **Occupation** | Chef | Service Station Attendant | Public Relations Officer | Web Developer | Apprentice Plumber | Mechanic | Real Estate Agent |
| **Relationship Status** | Single | Has Girlfriend | Married | Single | Has Girlfriend | Single | In Defacto Relationship |
| **Colour of Shirt Suspect Wore on Day of Crime** | Pale Yellow Sedan | White 4 Door Car | Beige 4 Door Car | Cream Car | Light Grey Sedan | White Sedan | Navy Blue Car |
| **Colour of Pants Suspect Wore on Day of Crime** | Light Blue | Light Blue | Black | Pale Grey | Pale Blue | Light Blue | Light Grey |
| **Colour of Hat Found at Suspects Residence** | Black | Navy Blue | Dark Grey | Charcoal | Light Yellow | Black | Charcoal |
| **Colour of Jacket Worn by Suspect on Day of Crime** | White | Black | Dark Grey | Midnight Blue | Dark Grey | Charcoal | Black |
| **Colour of Bag Owned by Suspect** | Dark Green | Black | Bottle Green | Dark Green | Dark Grey | Pale Blue | Black |
| **Tattoos and Distinguishing Marks** | None | Southern Cross Tattoo on Right Shoulder | Chinese Symbol Tattoo on Chest | None | Large Abdominal Scar | None | None |

# Appendix I

## STATEMENTS OF PEOPLE WITH AN ALIBI DURING THE CRIME

**STATEMENT 1**

22 years old
Lives in South Australia
Employed
Not currently in a relationship
No tattoos

**STATEMENT 2**

24 years old
Resides in Adelaide
Sometimes works weekends
Has never been in a relationship
Hates tattoos

**STATEMENT 3**

Under the age of 27
Lives in Adelaide
Works for commission
In a relationship
No tattoos

**STATEMENT 4**

Born after 1987
Lives south of the city
Currently working
Committed to his partner
Had invasive emergency surgery 6 months ago after his appendix burst

**STATEMENT 5**

Over the age of 20
Lives less than 15 kilometres from the city
Unemployed but studying law full time
Engaged
Has a tattoo on chest

**STATEMENT 6**

Birthday is in the second half of the year
Lives near the beach
Works in his families' business
Recently broke up with his girlfriend of 2 years
Thinking about getting his first tattoo but hasn't get gone through with it

**STATEMENT 7**

Birthday is in the first half of the year
Lives between 5 and 25 kilometres from Adelaide's city centre
Has held the same position in his employment for 2 years
Married his high school girlfriend 6 months ago
Likes tattoos