

Running Head: EMOTION TALK AND MEMORY IN CHILDREN

Does Emotion Talk and Emotion Knowledge Effect Children's Recall of a Staged Event?

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A thesis

submitted to the Victoria University of Wellington

in fulfillment of the requirements for the degree of

Masters of Science in Psychology

Victoria University

2010

### Abstract

The current study compared children's memory for information accompanied by emotional or non-emotional talk, and also investigated the utility of emotion knowledge in prediction of recall. Seventy-five children aged 5-6 years participated in a staged event that involved visiting separate stations containing connected, causal information of an emotional or non-emotional theme. Children were assessed with a memory interview one week later. Children reported significantly more correct information from stations with an emotional focus. Children's emotion knowledge did not predict recall, however. Results show children better recall emotion-related information even when causality and connectedness is controlled for. Implications of the finding are discussed.

### Acknowledgements

I would firstly like to thank Dr Karen Salmon for supervising this project. Thank you for your ideas, enthusiasm and dedication to the study, as well as your unending warmth and support. Your assistance in completing this thesis has been invaluable.

Thank you to Janelle McIvor and Adrienne Girling; the countless hours of collecting data and creating a coding system would not have been the same without you both. Thank you also for being supportive friends during the process.

Finally I would like to acknowledge the children who participated in this study, and their parents and caregivers for allowing them to take part. Many thanks also to the principals and teachers of the participating schools who so patiently and enthusiastically enabled us to conduct our research.

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*Children, Emotion, and Memory*

During a child's first few years of life a foundation is laid for the development of social, emotional, physical and cognitive skills required to function adaptively in the world. Although these skills will continue to develop and change across the lifespan, this early stage is critical as problems occurring during this period of rapid developmental change can have negatively cascading effects that may reach into adulthood (Maughan et al., 2009; Rutter, 1996). Socio-emotional skills lie among the myriad of skills children acquire, and these have a profound impact on the child's wellbeing across the lifespan. Children must learn about their emotional and social world, gaining expertise in recognising their own and others' emotions, the thoughts and beliefs that may drive those emotions, and the ability to adaptively manage and respond to emotions.

One of the most powerful contexts in which children learn about emotions is through conversation. Emotion talk serves to teach children about the names, causes, consequences and evaluations of their emotions and emotional experiences (Fivush, Haden, & Reese, 2006).

Critical skills in understanding of emotion, or *emotion knowledge*, are gained through the process of these conversations, skills that profoundly impact a child's wellbeing (Fivush, 2007). In fact the impact of a child's level of emotional and psychological understanding begins to become apparent even by the preschool years, where preschooler's emotion knowledge has been shown to predict social competency in early primary school years (Denham et al., 2003). The importance of emotion knowledge continues into the school years where it has been shown to predict children's social skills and peer group popularity, positively influence the prosocial behaviour received from other children and mediate the influence of verbal ability on social

skills (Cassidy, Werner, Rourke, Zubernis & Balaraman, 2003; Mostow, Izard, Fine & Trentacosta, 2002).

A recent implementation of an emotion-based intervention program particularly highlights the relationship between emotion talk, emotion knowledge and subsequent factors related to children's wellbeing. The Emotion Based Program (EBP; Izard et al., 2008) centered on the assumption that aiding children's understanding of and ability to express their emotional states would subsequently increase children's conscious control of their emotions. While the program used varying visual aids, the majority of the information about emotions was conveyed verbally. Instructors informed and encouraged children to recognise and label various emotional expressions, classes discussed the causes of various emotions, and various emotional regulation techniques were explained. Specific dialogues were included to assist teachers in tutoring and coaching emotion regulation skills. When evaluated, EBP was shown to produce greater increases in emotion knowledge and emotion regulation, and greater decreases in negative emotion expression, aggression, anxious and depressed behaviour and negative peer and adult interactions than the comparison intervention program not focused on talking about emotions.

The research discussed highlights the importance of emotion talk for children's developing emotion knowledge and subsequent wellbeing. Nevertheless there is a silent, yet equally important factor to consider in this relationship. *Memory* is a critical mediator of the relationship between emotion talk and emotion knowledge; put simply, children's learning gained from conversations about emotions is limited to what they remember about these conversations. For example, Laible (2004) found that mothers who talked in a more elaborative manner about emotional themes of children's and story book character's behaviour had children who demonstrated higher levels of emotion knowledge. The author suggested that these children



were forming stronger and more accessible memories of emotional and moral experiences, and thus these memories were influencing the development of their emotion knowledge. To gain a more complete understanding about the impact of emotion talk on emotion knowledge we must first understand what children remember about conversations about emotions, in comparison to their recall of non-emotion focused conversations.

Of additional importance is the effect that emotion knowledge itself has upon memory. Higher emotion knowledge in children has been demonstrated to be related to more specific autobiographical remembering, including increased recall of emotional-evaluative information (Wang, 2008). Emotion knowledge may interact with memory by facilitating children's interpretation and understanding of personal events. An increased understanding of events would in turn enhance both the organization and personal relevance of events to be held in memory. Then, because the organization and relevance of the events is increased, the events would therefore be made more memorable (Wang, Hutt, Kulkofsky, McDermott, & Wei, 2006). The impact of emotion knowledge on recall of verbal information has clear importance, therefore, due to the documented impact of emotion knowledge on autobiographical memory. Despite the documented influence of emotion talk on emotion knowledge, there is currently little research that investigates the converse effect of emotion knowledge on recall of emotion-talk, in comparison to non-emotion centered talk. To date one experimental study has investigated the impact of emotion knowledge on children's recall of an event featuring emotional and non-emotional content, with results revealing emotion knowledge predicted total recall (van Bergen & Salmon, in press).

Separate lines of research demonstrate the significant impact of emotion talk on children's emotion knowledge (Dunn, Brown, & Beardsall, 1991; Fivush et al., 2006; Izard et al.,

2008) and the impact of emotion knowledge on memory (van Bergen & Salmon, in press; Wang, 2008; Wang et al., 2006). Fundamental questions remain, however, regarding what information children remember about conversations about emotions, in comparison to non-emotional conversations. There also exists a need for further research on the effects of emotion knowledge on what children recall. These questions have clear value in furthering understanding of the memory effects of both emotion talk with children and emotion knowledge, also potentially informing theory on the development of emotion knowledge.

The current study addresses these issues by comparing children's recall of information from a staged event featuring emotional and non-emotional adult child talk, and the influence of emotion knowledge on this relationship. As later discussed, the information is matched for a number of potentially confounding factors, thereby allowing the relationship between emotion talk and memory to be seen more clearly. Thus, the current study aims to provide greater understanding of the influences of emotional quality of talk and emotion knowledge on children's memory.

To this purpose the effects of adult child talk on children's memory will firstly be reviewed, followed by the effects of emotion talk on memory more specifically. Moving then to the comparison between recall of emotional and non-emotional information, the literature on recall of emotional and non-emotional language presented in text and in talk will be discussed, including a consideration of mediators of this relationship. Finally, the development of emotion knowledge and its effects on memory will be reviewed before the introduction of the current study.

*The Influence of Parental Talk on Children's Memory*

One of the most powerful demonstrations of the effect of talk between adult and child on memory is revealed when investigating early parent-child talk about past events. Not surprisingly, children's early conversations about the past tend to be disconnected and brief, with the majority of content and structure stemming from adults' contributions (Nelson & Fivush, 2004). Of particular relevance is that young children's memory recall appears highly dependent on adult talk *during* the events to be remembered. In an illustration of the effect of adult talk on memory, Haden and colleagues asked mothers to interact with their 30-42 month old children in a novel play event (Haden, Ornstein, Eckerman, & Didow, 2001). Children's recall of the event was tested one day or one week later. Although verbal recall at that age is very limited, the results demonstrated that *only* aspects of the event that the mothers talked about and children responded to verbally or non-verbally were recalled by the children. Similarly, Tessler and Nelson (1994) found 3-year old children only recalled elements of a natural history museum trip that had been discussed jointly by mother and child.

Adults differ markedly in the way they converse with their children about past events, however, varying along a dimension of elaborativeness (see Fivush et al., 2006, for a review). Highly elaborative mothers' style features the prominent use of open ended questions, with the provision of increasing amounts of detail so the parent and child eventually shape a story. In contrast, less elaborative mothers use fewer and more redundant questions, typically repeating the same question until a specific detail is obtained (Nelson & Fivush, 2004). Although mothers increase their elaborations in accordance with children's age and narrative skill, the style distinction between high and low elaborative mothers remains constant over time (Reese, Haden,

& Fivush, 1993), displaying remarkable consistency over the preschool years (Harley & Reese, 1999; Reese, Haden, & Fivush, 1996).

The impact of discussion style on recall has been demonstrated for conversation both during and after an event, and in both naturalistic and experimental paradigms. For example, an experimental study showed that engagement in elaborative talk either during or after an event enhanced 5-year old children's correct recall, relative to empty talk involving minimal labeling or descriptions of actions, objects and goals. Children who were engaged in elaborative talk also reported fewer errors than children who engaged in empty talk (McGuigan & Salmon, 2004). Longitudinal evidence from naturalistic studies also demonstrates the powerful effect of language and conversation on memory, revealing that maternal reminiscing style predicts children's later ability to recall personal events (Nelson & Fivush, 2004; Ornstein, 2008). There is clear evidence that the more mothers engage in highly elaborative discussion about the past with their children, the better their child's memory skills (Bauer & Burch, 2004; Farrant & Reese, 2000; Fivush & Vasudeva, 2002; Leichtman, Pillemer, Wang, Koreishi, & Han, 2000; Low & Durkin, 2001; Peterson, Jesso & McCabe, 1999; Welch-Ross, 2001).

Results from studies involving training mothers in the use of elaborative talk further support the causality of the relationship. Reese and Newcombe (2007) showed that mothers who had been trained to engage in elaborative reminiscing had children who remembered and reported more descriptions, actions and evaluations of events in discussion than children of untrained mothers, at two later time points. In conversations with researchers, those children of trained mothers who also had higher self awareness at the start of the study reported a greater quantity of accurate information. Furthermore, training mothers to engage in elaborative talk during an event has also been demonstrated to lead to quantifiable improvements in children's

recall, as children of trained mothers recalled more embellished details of a novel event than children of untrained mothers (Boland, Haden, & Ornstein, 2003). This research further highlights the beneficial effects of elaborative talk on children's memory.

Research on the effects of adult child talk demonstrates the significant impact of talk on children's memory. Talk during or after an event, particularly if in an elaborative style, has been shown to lead to both short and long term benefits on children's recall. Furthermore, only talked-about elements of an experienced event are recalled verbally by very young children. Clearly then, talk about an experience has a special effect on memory, over and above the memory effect of an experienced event itself.

#### *The Influence of Emotion Talk on Children's Memory*

Although fewer studies have looked specifically on the influence of emotion talk on memory, a considerable body of research on the acquisition of fear provides an illustration of the impact of emotional verbal information on children's memory. A series of studies has demonstrated that verbal emotional information is held in children's memory to the extent that it has substantial effects on children's fear beliefs in both the short (Field, Argyris & Knowles, 2001; Field & Lawson, 2003) and long term (Field, Lawson & Banerjee, 2008; Muris, Bodden, Merckelbach, Ollendick & King, 2003). Verbal information has been shown to predict the direction of children's fears; when children were read stories involving positive emotional descriptions of a novel animal they demonstrated decreased fear levels one week later, while when read stories involving negative emotional content children's fear levels towards the novel animal increased at the latter time point (Muris et al., 2003). Verbal threat information about novel animals (the Australian marsupials the *quoll*, *cuscus* and *quokka*) has been shown to create fear beliefs in children that persist over six months, as well as leading to immediate avoidance

behaviours related to that animal (Field et al., 2008). The long term effect on beliefs and behaviour demonstrates the strength to which this initial emotional information is held in children's memory. This effect was likely to be purely due to the verbal information provided, as children were unlikely to be exposed to further information about the novel animals over the delay period.

Related studies also reveal that prior verbal information effects subsequent learning. For example, when children received associative learning consistent with verbal information, their acquisition of a correct association between an animal and information (for example, having had a bad time when meeting an animal that had prior threat information) was almost immediate (Field & Lawson, 2008). In contrast, when children had not received prior information it took them much longer to detect and accurately predict a contingency between an animal and good or bad outcome. When the associative learning is incongruent with the verbal information, however, children overestimated the contingencies to make them more consistent with the verbal information, effectively biasing them in favour of the verbal information (Field & Lawson). This research shows that verbal emotional information has a strong impact on children's memory, serving to have demonstrable effects on both subsequent learning, and immediate and later beliefs and behaviour.

Research on fears is one method through which the memory effects of emotion talk are demonstrated. An alternative method, more precisely demonstrating the effect of emotion talk on memory, addresses the effects of discussion of emotions on recall of an event. Importantly, post-event discussion of emotions appears to have a beneficial effect on recall, over and above the effect of post-event discussion in itself (van Bergen & Salmon, in press). In van Bergen and Salmon's study, groups of 3-4 and 5-6 year old children engaged in an emotion-rich event

involving introduction to toy animals in varying emotional states. Two days after the event, children participated in one of four types of reminiscing with an experimenter. These were *emotion-cause* reminiscing, where causes of the animals' emotions were described, *emotion-expression* reminiscing, where animals' emotion expressions were described, *no-emotion*, where animals' physical characteristics were described, and a *minimal* condition which was non-elaborative, providing little information or opportunity for children to contribute to the reminiscing conversation. Memory was assessed with a standardised interview two weeks later. Results showed that children who had reminisced about emotions recalled both more emotional *and* non-emotional information than children in minimal and no-emotion reminiscing conditions. Children were highly accurate in their recall of all information, regardless of condition.

The improved recall of non-emotional information in van Bergen and Salmon (in press) is of particular interest. The authors suggest their findings may reflect a number of factors, including that discussion about emotions may have rendered those conversations more engaging and therefore more memorable to children. Also important, the authors suggested that emotional reminiscing may have served to provide a coherent and highly connected structure for the event. This would facilitate recall by providing increased opportunity to reinstate the entire event in memory. The finding that the emotion-cause reminiscing condition led to the greatest overall recall supports this explanation, as discussion of the causes of emotions provides an explicit logical structure for the event and relationships between actions, objects and descriptions. Therefore, talk about the emotional elements of an event may benefit recall of an entire event, possibly by providing a logical structure through which children can present the event in memory (van Bergen & Salmon, in press).

An issue arises from this argument, however, in that the only type of causal information in the event was emotional. This therefore prevents the memory benefits of causal emotion talk to be disentangled from the benefits of causal talk per se. Causal information is very important to children, they have been shown to be actively motivated to attain it in conversation with adults (Frazier, Gelman, & Wellman, 2009). Furthermore information connected by causal relations has been shown to be better recalled than arbitrarily connected information (Bauer & Mandler, 1989). This particularly highlights the importance of controlling for causality when comparing the memory effects of emotion talk with non-emotion talk.

Although there is not a large body of experimental research in the area, the studies discussed highlight the powerful influence of emotion talk on children's memory. Van Bergen and Salmon (in press) provided evidence in support of a beneficial effect of discussion of emotion specifically, on recall of an event. The positive memory effect of emotion talk compared to non-emotional talk is of particular interest, although the need to control for the memory effects of causality of information is of note.

#### *Comparison of Children's Recall of Emotional and Non-emotional Information*

The research discussed thus far has indicated that talk, particularly emotion talk, can be held in children's memory, and that post-event emotion talk may have an additional benefit for memory in comparison to non-emotional post-event talk. Further relevant studies have specifically compared children's recall of emotional and non-emotional talk during an event.

Davidson and colleagues provide an illustration of this (Davidson, Luo, & Burden, 2001). To compare children's recall of information relating to emotion and non-emotional talk, children were told stories of varying emotional quality. Specifically, the stories included high emotion (e.g. "That night Maria dropped a carton of eggs in the kitchen and her parents got mad at her"),



low emotion (e.g. “That night Maria dropped an apple in the kitchen and her parents got mad at her”) and non-emotional content (e.g. “Maria watched television with her brothers”).

Interestingly, in both younger (7- year old) and older (9- and 11- year old) children, story actions with emotional content were better recalled than actions without emotional content, even when the emotional actions were of low emotional significance (e.g. dropping an apple, as opposed to a carton of eggs). Furthermore, emotional behaviours that were labeled with an emotion (e.g. “Ron was happy when his father told him he was going to buy Ron a brand new bike”) were found to be better recalled than identical emotional behaviours that were not labeled (e.g. “Ron’s father told him that he was going to buy him a brand new bike”). Thus the study provides further evidence of children’s superior recall of talk featuring emotional content, over non-emotion centered talk.

Critically, however, this study also failed to control for causality. In fact, while the story contained a number of causal emotional statements (e.g., “Ron was sad because his best friend was moving away” and “Maria noticed that her plant did not look well and that made her sad”) there were no explicit causal statements that did not involve emotional content. This failure to control for the memory effects of causality limits the authors’ conclusion that the emotional content of the talk led to the beneficial effects on memory, as similarly to van Bergen and Salmon (in press), it is possible the memory advantage for causal information may have accounted for the finding.

While the current study particularly concerns the effect of emotion *talk* on memory, inferences may also be drawn from research comparing the recall of emotional and non-emotional language in text. Howe (2007) investigated 8- and 12- year old children’s recall and recognition of word lists containing neutral and negatively-valenced emotional words. The

results did not indicate a memory advantage for emotional words. This was unexpected, as a prolific body of research using this paradigm with adult participants demonstrates that emotional words presented in participants' native language are better remembered in free recall, than are neutral words (e.g., Anooshian & Hertel, 1994; Colombel, 2000; Doerksen & Shimamura, 2001; Kensinger et al., 2002; LaBar & Phelps, 1998; Phelps, LaBar, & Spencer, 1997; Suzuki, 2004; see Murphy & Isaacowitz (2008) for a review). In contrast, Howe (2007) found that children recalled and recognized neutral words better than emotional words. Errors, in the form of false recall, were higher for neutral words, although false recognition was higher for emotional words. Essentially, the results indicated that while children could accurately discriminate between neutral words that were and were not presented in the original material to be remembered, they were much less accurate in distinguishing between original and new negative emotional words, despite familiarity and associative strength of words being controlled for.

Howe's (2007) explanation for the findings is of particular interest. Howe suggests the results may reflect negative emotional words being more interrelated than neutral items. For example, the negative emotional words *cry* and *anger* are more interrelated than the non-emotional words *chair* and *sweet*. Howe argues that this greater relatedness lead children to process negative emotional words in a deeper and more relational way, thus rendering presented and un-presented emotional words more difficult to discriminate from one another than neutral words.

This explanation is in line with the suggestion of Talmi and Moscovitch (2004) that emotional information is in fact inherently more interrelated than neutral information. Importantly, Talmi and colleague argue that the increased relatedness of emotional stimuli *accounts* for the memory advantage often found in recall of emotional language in text (Talmi &

Moscovitch, 2004). In their research with adult participants, Talmi and Moscovitch increased the relatedness of neutral words by grouping neutral words into semantically related categories. In the series of studies they revealed that the memory advantage of emotional words over neutral words in free recall disappears when emotional words are compared with interrelated neutral words. In fact, results showed that while relatedness and imagery predicted words' recall, the emotionality of the words failed to do so. The finding was suggested to reflect the utility of semantic relatedness in organizing the information in memory, thus increasing memorability (Talmi & Moscovitch, 2004). Importantly, the authors suggested that increased semantic relatedness may largely or entirely mediate the advantage of nontaboo emotional words in memory, through the increased opportunity to organize the information in memory.

In summary, a memory advantage of emotion talk over non-emotional talk has been illustrated (Davidson et al., 2001; van Bergen & Salmon, in press). These studies failed to control for the increased causality inherent in the emotional, but not neutral information, however, which limits any conclusion that emotional talk in itself leads to superior recall. Another important research finding of concern is that when relatedness is controlled for in the comparison of emotional and neutral word lists, the memory advantage of emotional information disappears (Talmi & Moscovitch, 2004). To date, no research has compared children's recall of information featuring use of emotion or non-emotional talk while controlling for causality and semantic relatedness of the information. Research in this vein would enable the relationship between emotion talk and memory to be disentangled from mediating effects, thereby providing greater insight on the true relationship between emotion talk and memory.

*The Influence of Emotion Knowledge on Children's Memory*

A separate, but related line of research has investigated the effect of emotion *knowledge* on children's recall. While parents differ in their styles of talking about emotion with children, there is a tendency for highly elaborative mothers to also include more discussion about emotions when reminiscing about events (Fivush, 2007). While a number of factors predict the development of emotion knowledge, such as cognitive and language ability, adult-child talk about emotions has a particularly profound influence (e.g., Denham, Zoller, & Couchoud, 1994; Dunn et al., 1991; see Fivush, 2007 for a review). For example, parenting behaviours such as mothers' explanations of their emotions and openness to children's emotional expression appears to be particularly beneficial in the development of children's understanding of emotion (Denham et al., 1994). As discussed earlier, it is suggested that memory is a critical mechanism through which emotion talk influences the development of emotion knowledge, as the effect of emotion talk on emotion knowledge is limited to what children remember about emotion-based conversations.

The relationship between emotion knowledge and memory has received little theoretical or empirical attention, however, despite cognitive, developmental and cross-cultural research suggesting the plausibility of a link between them (Wang, 2008). In the first empirical study on the topic, Wang and colleagues asked 3- year old American, Chinese and immigrant Chinese children to discuss two specific events that the children had experienced in the last two months (Wang et al., 2006). The events chosen to discuss had been nominated by the children's mothers. Emotion knowledge was measured through two tasks: an emotion production task in which the child was asked to describe situations likely to provoke happy, sad, angry and fearful feelings; and an emotion judgment task where the child was read a story then was required to point to a facial expression that best described how the protagonist felt in the story. Results revealed a link

between children's emotion knowledge and autobiographical memory, at both a group and individual level. American children had significantly higher emotion knowledge scores than the other cultural groups; they also provided more memory elaborations and described more contextual information than their Chinese peers, regardless of age and language skill. This was attributed to cultural differences in the belief of the importance of emotion and in the focus of mother-child reminiscing, serving to provide a further illustration of the impact of emotion talk on the development of emotion knowledge. At an individual level, children with greater emotion knowledge produced more extensive memory reports of the past events. This relationship was found in each of the cultural groups, and was independent of the influence of gender, age and language skills. In fact emotion knowledge had the strongest effect on children's memory reports, also mediating the effects of culture and language skills on children's accounts. This finding particularly highlights the influence emotion knowledge has on children's memory.

In a longitudinal extension of the study (Wang, 2008), children were followed up at 3.5 and 4.5 years of age. Group differences continued, with American children exhibiting greater levels of emotional knowledge, and producing more specific memory reports, which featured a greater use of internal states language. American and Chinese immigrant children also exhibited an increase in memory specificity over time, which corresponded with their advancing emotion knowledge. Native Chinese children showed this pattern at ages 3 and 3.5 years, although between 3.5 years and 4.5 years emotion knowledge remained constant and memory specificity dropped. On an individual level, children who had greater understanding of emotions recalled more event-specific details and emotional-evaluative information than those with less advanced emotion knowledge. This pattern was independent of culture and language skills. As previously found, emotion knowledge functioned as a mediator to the influence of culture and language on

memory specificity. Emotion knowledge also mediated the contribution of age, in that children's increasing memory specificity was accounted for by their advances in emotional knowledge (Wang, 2008).

These two studies provide compelling evidence for the powerful impact that children's level of emotion knowledge has on their memory recall. To explain their findings the authors suggested that a more advanced understanding of emotions may make certain events more memorable by aiding interpretation and understanding of the event, enhancing its personal relevance. Furthermore emotion knowledge may have provided an organizational structure that aided the integration of events into autobiographical memory, and thus lead to more effective memory storage and retrieval (Wang et al., 2006). Limitations were noted, however, in that the data could not reveal the specific cognitive and emotional processes underlying the connection between emotion knowledge and memory. The author suggested multiple pathways may be at work. Furthermore, the conclusions about the impact of emotion knowledge on recall were limited to autobiographical memory.

The impact of emotion knowledge on recall has also been demonstrated in van Bergen and Salmon's experimental study, described earlier. Emotion knowledge was measured using an Emotion Cause Production task, as in Wang et al. (2006). Results showed that emotion knowledge significantly predicted children's total recall of an event featuring toy animals of varying emotional states. This experimental study further supports the impact of emotion knowledge on children's recall. While this study contained both emotional and non-emotional information, however, the overall theme of the event was emotional in nature. Whether the finding can be replicated with information of more specific emotional or non-emotional themes remains of interest.

In summary, research has demonstrated that emotion knowledge is a powerful predictor of children's recall, being shown to predict total recall of an emotion-rich event (van Bergen & Salmon, in press) and lead to improved autobiographical recall of specific details and emotional-evaluative information in children with higher emotion knowledge (Wang, 2008). The potentially varying impact of emotion knowledge on recall of certain types of information remains of interest however, as the effects of emotion knowledge on memory may be limited to emotion-rich information. Investigation of the effects of emotion knowledge in an experimental design where information to be recalled varied in emotional quality would further advance the understanding the effect of emotion knowledge on children's memory. Furthermore, the utility of emotion knowledge in prediction of recall has only been demonstrated with an emotion cause production task and an emotion judgment task. It is of interest whether the utility of emotion knowledge in prediction of recall remains when alternative measures of emotion knowledge are used.

#### *Major Themes in Current Literature*

Major themes emerge from the literature discussed, that taken together may be used to inform expectations for the current study. These particularly regard the correct and incorrect recall of information from emotional and non-emotional talk, and the effect of emotion knowledge on recall.

Firstly, related research has demonstrated that emotional information is held strongly in children's memory (Field et al., 2001; Field & Lawson, 2003; Field et al., 2008; Muris et al., 2003), to the extent that children's recall of emotional information is superior to their recall of non-emotional information (Davidson et al., 2001). Of note is that the benefit of emotion talk appears to extend to additional, non-emotional details of an event (van Bergen & Salmon, in

press). The importance of controlling for causality and semantic relatedness when comparing emotional and non-emotional talk has also been highlighted, as these factors are more often associated with emotional than non-emotional information (Bauer & Mandler, 1989; Talmi & Moscovitch, 2004). In consideration of the body of literature documenting the impact of emotion talk on memory, however, is it expected that the effect of emotional information is sufficiently robust that even when causality and semantic relatedness of information are controlled for, the advantage of emotion talk compared to non-emotional talk will remain.

A second line of investigation concerns the errors reported by children. Although there is a dearth of research comparing the erroneous recall of emotion talk and non-emotional talk, it was noted that van Bergen and Salmon (in press) found that children reported extremely few errors in their recall of both emotional and non-emotional information, indicating a high level of accuracy in children's recall. Also discussed was Howe's (2007) finding that children were less accurate in their recall and recognition of emotional compared with neutral words, in recall of word lists. This finding was argued to be a reflection of the greater semantic relatedness inherent in emotional, but not neutral words. This was posited to lead children to have processed the emotional words in a deeper and more relational way, thus leading to greater difficulty distinguishing between original and new emotional words. When semantic relatedness is controlled for, it is likely accuracy will not differ in recall of emotional and neutral words (Talmi & Moscovitch, 2004).

Finally, research indicates that emotion knowledge enhances recall of event-specific and emotional-evaluative information (Wang, 2008), and predicts children's total recall of emotional and non-emotional information in an emotion-themed event (van Bergen & Salmon). Emotion knowledge may benefit recall by providing an additional structure and organization for



information held in memory. Therefore information that includes, or is closely related to, emotional information is likely to be impacted by a child's level of emotion knowledge. In addition, these studies have employed measures of emotion knowledge focused on children's ability to judge and produce causes of emotion. The ability of an alternative measure of emotion knowledge to predict recall remains untested.

### *The Current Study*

The existent literature would benefit from research permitting a greater depth of understanding of what information children remember about conversations about emotions, in comparison with non-emotional conversations. Research in this vein may enable further understanding about the development of children's emotion knowledge, through greater understanding of children's memory.

Although research suggests that emotion talk is held more strongly in children's memory in comparison to non-emotion focused talk (Davidson et al., 2001; van Bergen & Salmon, in press), these studies failed to control for causality and semantic relatedness of emotional and non-emotional information. Failure to control for these factors limits conclusions that emotion talk has a memory advantage over non-emotional talk, in and of itself. To date, no research has looked at the memory effects of emotion talk and non-emotional talk while controlling for associated factors known to effect recall.

In addition, while separate lines of research have indicated the effect of emotion talk and emotion knowledge on children's memory, there is a dearth of research concerning the potential interaction between the two influences. This is despite some evidence that emotion knowledge mediates children's recall, including recall about emotions (Wang, 2008; Wang et al., 2006; van Bergen & Salmon, in press). Research in this vein would also enable the relationship between

emotion knowledge and children's recall to be addressed more specifically. Furthermore, studies revealing an ability of emotion knowledge to predict recall have employed measures of emotion knowledge specifically assessing children's ability to produce and judge causes of emotions (Wang, 2008; Wang et al., 2006; van Bergen & Salmon, in press). It remains of interest whether a more inclusive measure of emotion knowledge also predicts recall.

The current study aims to address these issues by comparing children's recall of correct and incorrect information relating to emotional and non-emotional talk, while investigating the impact of emotion knowledge on correct recall of this contrasting information. Specifically, we have investigated whether the accuracy and completeness of children's reports of an event differs according to whether the talk used was emotion focused or non-emotional in focus, where both types of information contain interrelated components and causal relationships. In addition, we have investigated the extent to which children's level of emotional understanding predicts their memory for correct emotional and non-emotional information.

To address these research questions, children aged between 5 - 6 years participated in a staged event, "Visiting the Pretend Zoo" (see McGuigan & Salmon, 2004; van Bergen & Salmon, in press). Children of this age were selected to enable comparable results to van Bergen and Salmon (in press). Furthermore it could be expected that there would be considerable variability in children of this age range's level of emotion knowledge (Pons, Harris & de Rosnay, 2004; Pons, Lawson, Harris & de Rosnay, 2003).

The event involved children visiting six separate stations individually with an experimenter, who introduced the child to a new animal at each station using either emotional or non-emotional talk. Thus children experienced both emotion talk and non-emotional talk in the event. For example, in emotion talk stations children were introduced to an animal, were told the

emotional state of the animal, the cause for the emotion, and the way the emotion could be identified. Children then performed two activities related to the animal's emotion, then a generic activity was engaged in to signal the ending of that station and precede introduction to the next animal. In contrast, non-emotional stations did not involve emotion talk. Importantly, the information provided was designed to closely match the emotional information in causality and relatedness, however. To achieve this, matching non-emotional stations were structured in the same manner but the state of the animal related to physical information as opposed to emotional. Children were still provided with a name, state, cause of state, identification for state and performed two activities related to the state of the animal, also concluding the visit to the non-emotional station with a generic ending.

Children's memory was assessed by an interview with a separate experimenter approximately one week later. This delay was selected to ensure maximum variability in recall, as it was expected to avoid both floor and ceiling effects in children's quantity of recall. As noted, the study was designed to be comparable with that of van Bergen and Salmon (in press), who employed a two week delay. A one week delay was therefore also deemed appropriate because, in contrast to van Bergen and Salmon, the current study did not employ a reminiscing interview so there was no opportunity to reinstate the event in children's memory.

After the interview, emotion knowledge was measured using the Test of Emotion Comprehension (TEC; Pons & Harris, 2000). This is a more inclusive measure than those used in previous studies of emotion knowledge, comprising nine components of emotion knowledge. In this way the current study aimed to extend the existing literature on the utility of emotion knowledge in prediction of children's recall.

Based on the literature discussed above, three hypotheses were proposed.

The main finding expected was that children would recall more information from stations using emotion talk than stations using non-emotional talk.

Regarding the errors reported by children, it was anticipated that, as in van Bergen and Salmon (in press), children would not differ in accuracy of recall of information from emotional or non-emotional stations.

Finally, it was expected that emotion knowledge would predict with correct recall. It was anticipated that children's level of emotion knowledge would most strongly predict their recall of information from stations using emotion talk. Children's recall of information from non-emotion talk stations was also expected to be predicted by their level of emotion knowledge.

## Method

### *Participants*

Consent for the study was obtained from the Victoria University Ethics Committee. Children were recruited through four Wellington primary schools. All of the schools had received Decile ratings, which indicate the extent to which a school's students come from low socio-economic communities. Decile 1 schools are those with the highest proportion of students from low socio-economic communities. Three of the participating schools were rated as Decile 10, and one school as Decile 2.

The recruitment process involved information firstly being provided to school principals (see Appendix A for principal information letters). Once permission to conduct the study had been attained from principals, teachers handed out information letters and consent forms for children to take home to their parents (see Appendix B for parent information letters and consent forms).

Eighty four children returned signed consent forms and participated in the event of the study. Nine children were unavailable to be interviewed in the necessary time period. Children in the final sample ( $N = 75$ ) were aged between 5 years 1 month and 6 years 5 months ( $M = 5$  years 8 months;  $SD = 3$  months). The sample was comprised of 42 girls ( $M age = 5$  years 9 months,  $SD = 3$  months) and 33 boys ( $M age = 5$  years 8 months,  $SD = 3$  months). The majority of children were of New Zealand European/Pakeha descent.

### *Design*

This study included both within and between participants factors. To test the main hypothesis children's recall of information from stations featuring emotion talk or non-emotional talk was compared within participants. Both total recall, and recall of nine specific information variables were compared. Individual variables were *name*, *state*, *state expression*, *state cause*, *state-cause link*, *description*, *location* and *core* and *non-core activities* (explained in greater detail later). The states referred to were either emotional or non-emotional. All information variables were expected to be better recalled by children when from stations where emotion talk was used.

To test the hypothesis regarding erroneous recall, children's accuracy and total errors in recall were compared within participants. Children were not expected to differ in accuracy between recall of information from emotional and non-emotional stations.

To investigate the effect of emotion knowledge on recall, children's emotion knowledge was compared between participants. Emotion knowledge was expected to predict children's recall of information, and most strongly predict children's recall of information from stations where emotion talk was used.

## *Materials*

### *Zoo event.*

Following the outline of the events in McGuigan and Salmon (2004) and van Bergen and Salmon (in press) both the experimenter and child were dressed in a “zookeeper” hat and badge. The event involved visiting six individual stations where children were introduced to an animal and engaged in two brief tasks related to the animal. The animals were stuffed soft toys; a cheetah, elephant, hippo, mouse, crocodile and lamb; all of approximately 50cm x 30cm x 20cm in size (see Appendix C1-C7 for photographs of animals and props). Props related to the activities performed with each animal were a blanket, wrapped birthday present, paper and crayons, a small teddy bear, and a small soft toy duck. The structure of the event is outlined in Table 1.

### *Memory interview.*

Two audio recorders were placed in front of the child. At the conclusion of the interview children were allowed to pick two stickers from a container, and thanked for their participation.

### *Emotion knowledge.*

The Test of Emotion Comprehension (TEC; Pons & Harris, 2000) was used to assess children’s emotion knowledge. This test employs an A4 picture book, requiring children to point to one of four emotional outcomes (typically facial expressions) that is the most appropriate response to a simple cartoon scenario (see also Appendix D for TEC questions). The test is divided into nine blocks, each measuring a particular component of emotion understanding: (I) recognition of emotional facial expressions (e.g. recognition of the face of a sad person); (II) understanding of external causes of emotion (e.g. attributing an appropriate emotion to a character about to get a present); (III) understanding of desire-based emotions (e.g. ascription of

an emotion to two characters in the same situation but with opposite desires); (IV) understanding of belief-based emotions (e.g. attribution of an emotion to an animal enjoying a meal, without realizing a predator is watching); (V) understanding of the influence of reminders on current emotional state (e.g. ascribing an emotion to a character looking at a photo of a dead pet); (VI) understanding of the possibility to control emotions (e.g. employing a strategy such as distraction to a character wanting to stop feeling sad); (VII) understanding of the possibility of hiding an emotion (e.g. ascribing an emotion to a character who is smiling to hide distress); (VIII) understanding of mixed emotions (e.g. attribution of an emotion to a character receiving a gift that is likely to produce positive and negative emotions); and (IX) understanding of moral emotions (e.g. ascription of an emotion to a character who is hiding that they have done a naughty thing).

As a relatively recently designed test there is limited research on the TEC's psychometric properties. In research to date, however, it has shown good test-retest reliability within a 3 month delay (Pons, Harris, & Doudin, 2002). It also shows suitability for children aged 3- to 11- years old, as improvements in scores have been shown to correlate with expected age-related gains in children's emotion knowledge (Pons et al., 2004; Pons et al., 2003). The expected relationship between increases in age and improvement in scores has also been shown in children not from industrialized Western countries (Tenenbaum, Visscher, Pons, & Harris, 2004).

### *Procedure*

All stages of the research were conducted at the child's school, during school time. Children were one-on-one with an experimenter in both the event and interview. Children were randomly allocated to one of six randomly-generated orders of presentation of the animals in the event, to control for any effects that presentation order may have had on memory.

One of three experimenters was randomly assigned to either the event or interview for each participant. Factors controlled for were the number of participants and gender of participants per experimenter, and the pairings of event-conducting and interview-conducting experimenters to ensure the same two experimenters were not always paired together.

*Zoo event.*

Children were accompanied by an experimenter to a classroom, with the explanation that they were “going to visit a pretend zoo”. The child was then introduced to a second experimenter, who was the “zookeeper”. The event was novel and ambiguous, in that it did not relate to general knowledge children would typically hold about a zoo. At each of the six stations in the event, children were introduced to an animal and then required to engage in two brief activities with that animal. Two of the animals were presented with positive emotional (happy) information, two with negative emotional (scared) information, and two with non-emotional (physical state) information. The comparison of negative emotional and positive emotional information specifically was the focus of a separate study. At each station children were given a causal explanation for why the animal felt or looked that way, then pointed out how the animal’s state is observable (e.g. “you can see she is happy because she is smiling”). Table 1 presents an outline of the animals, ascribed states including causes and observations about the animals, and the activities children engaged in (see also Appendix E for full event script).



Table 1. *Event structure*

<b>Animal</b>	<b>Emotion and Observation</b>	<b>Core Activity</b>	<b>Non-Core Activity</b>
Cheetah <i>Positive emotional</i>	<p>“Is happy because she has been playing with friends”</p> <p>“You can see that she is happy because she has a big smile”</p>	<p>Pat Cheetah</p> <p>Find friend who is hiding</p>	<p>Say Goodbye</p> <p>Wave</p>
Hippo <i>Negative emotional</i>	<p>“Is scared because there was a loud noise”</p> <p>“You can see he is scared because his fur is standing up”</p>	<p>Hug Hippo</p> <p>Put Blanket over Him</p>	<p>Say Goodbye</p> <p>Wave</p>
Lamb <i>Non-emotional</i>	<p>“Has a warm coat because she usually lives outside”</p> <p>“You can see she is warm because she has such thick fur”</p>	<p>Stroke Lamb’s fur</p> <p>Take off her hat</p>	<p>Say Goodbye</p> <p>Wave</p>
Elephant <i>Positive emotional</i>	<p>“Is happy because today is his birthday”</p> <p>“You can see that he is happy because he is jumping around dancing”</p>	<p>Give birthday present</p> <p>Sing Happy Birthday</p>	<p>Say Goodbye</p> <p>Wave</p>
Mouse <i>Negative emotional</i>	<p>“Is scared because her mother is not at home”</p> <p>“You can see that she is scared because she is crying”</p>	<p>Draw a picture</p> <p>Give Mouse the picture</p>	<p>Say Goodbye</p> <p>Wave</p>
Crocodile <i>Non-emotional</i>	<p>“Can see well in the dark because he is awake at night”</p> <p>“You can see that he sees well at night because he has such big eyes”</p>	<p>Do the Sleep dance</p> <p>Give Crocodile his teddy bear</p>	<p>Say Goodbye</p> <p>Wave</p>

The following steps were taken to match the quality of emotional and non-emotional talk. Firstly, the number of words spoken by the experimenter in each station was matched. Secondly, the effect of semantic relatedness of information on memory (discussed earlier) was taken into account. Both emotional and non-emotional talk was scripted to ensure they both closely related to the emotional or non-emotional state that the station featured, to form an equally coherent and thematically related story for both emotional and non-emotional information (as illustrated by the event script). To achieve this, the order and descriptive quality of presentation of information was matched across stations. For example children's were first given a name, state and cause for this state, then the researcher highlighted how the state could be observed. In this manner the degree of relatedness between information was controlled.

Causal talk was also controlled for. Importantly, causal relations have been revealed to differ in regards to several properties, namely the *type* and *strength* of the relation (Tapiero, van den Broek, & Quintana, 2002). Strength is affected by the necessity and sufficiency of the cause in creating a consequence, by the distance of the cause and consequence in text, and by the type of cause (e.g., physical or psychological). Although the type of cause in the current study necessarily differed (as causes lead to either an emotional or non-emotional state) the other causal factors were controlled for. Firstly, the distance between the cause and consequence in text were matched across stations, with consequence immediately following cause in both cases (e.g., "the lamb is scared because her mother is out", "the lamb has a warm coat because she usually lives outside"). Secondly, the degree of necessity and sufficiency of the cause and consequence were matched, to the extent that it is possible while differing in the types of causes.

Both emotional and non-emotional causes were designed to be sufficient to explain the consequence (e.g., “mother is out” is a sufficient explanation as to why a mouse should be crying, and “liv[ing] outside” is a sufficient explanation for why a lamb would need a warm coat). Similarly, as the degree of necessity of emotional causes was deemed to be moderately strong (e.g., the mouse was unlikely to be scared if her mother hadn’t gone out, the elephant may not have been happy if it had not been his birthday), the non-emotional causes were designed to have a similar strength of necessity (e.g., the lamb was unlikely to need a warm coat if she didn’t live outside).

To further control for causality and relatedness, talk and activities at both emotional and non-emotional stations involved directing children to a resolution to the states observed. For example, the lamb was introduced with the statement that the lamb “has a warm coat because she usually lives outside”. Following this, children were engaged in the activity to take off the lamb’s hood “because the lamb has such thick fur, she is too hot being inside”. Similarly, because the Hippo was scared, children had to give the Hippo a hug and a blanket, to make it less scared. In this way children received both causal and interrelated information as part of both emotion talk and non-emotional talk.

The nature of the activities was also controlled for. Each station involved one activity where the child gave the animal an item, and one activity where they touched the animal (for example, stroked the animal’s fur). With each type of station, (positive emotional, negative emotional and non-emotional) children participated in one engaging performance activity (singing, dancing or drawing).

Children were not permitted to perform actions other than those in the standardized event. The event took approximately seven minutes to complete, after which children were thanked for their participation and taken back to their classrooms.

*Interview.*

Most interviews were conducted seven or eight days after the event ( $M$  interview delay = 7.29 days,  $SD = 0.90$ ). Occasionally circumstances prevented children from being interviewed within this time period, so to maximize recruitment children who were available between 6-12 days after the event ( $N = 11$ ) were also interviewed. To check that differences in delay did not effect the results, all analyses were also conducted with participants who were not interviewed after 7-8 days removed from the dataset. The pattern of the results remained the same.

Interviews adhered to the interview protocol produced by the National Institute of Child Health and Human Development (NICHD; Orbach et al., 2000; see Appendix F for interview protocol). This interview protocol was selected as it has been demonstrated to lead to more accurate and detailed reporting of information in children, in comparison to when alternative or no interview protocols are employed (Lamb, Orbach, Hershkowitz, Esplin, & Horowitz, 2007; Orbach, et al., 2000; Sternberg, Lamb, Orbach, Esplin, & Mitchell, 2001).

In adherence to the NICHD interview protocol structure, interviews firstly contained an introduction and rapport-building stage which involved clarifying the purpose of the interview, assuring the child they were allowed to say if they did not remember something or did not understand what the interviewer meant, and discussion of a something fun that had recently happened to the child. During the discussion of a neutral event children are effectively trained in

the type of responses expected of them, as information reported is followed up by open ended and cued prompting questions. Discussion of the zoo event was then introduced with the statement: “You’ve done really well telling me lots and lots of things, now, I’d like to talk to you about the day you visited some animals here at school. I wasn’t in the room and I’d really like you to tell me what happened. Tell me everything you can remember about that, from the beginning to the end.” In adherence to NICHD Protocol, children’s reports were followed up using primarily open-ended questions until their memories were exhausted. Non-directive prompts such as “uhuh” and “tell me more about that” were used throughout. Cued invitations such as “you said X, tell me more about that” were used to return to aspects previously mentioned by the child.

When it appeared children’s memories were exhausted, prompted questions were used. Prompted questioning consisted of one question per animal, “I heard you visited an (e.g. elephant) at the Zoo. Tell me about that”. Children’s responses to these questions were followed up with non-directive prompts and cued invitations, as in free-recall. The order of animal names presented for prompted questioning was counterbalanced.

The questioning stage of the interviews ended when children could not report any more information. Following this, children were administered the TEC (Pons & Harris, 2000).

### *Coding.*

All memory interviews were transcribed verbatim. The coding system was devised by the experimenters (see Appendix F for Coding System). Information was coded according to whether it had been reported during free-recall or in response to prompted questioning. Only

previously unreported information was coded in prompted questions. Information was grouped according to whether it had regarded stations presented using emotion-talk or non-emotional talk, and further coded into nine variables. Children were credited with correctly identifying the animal's *states*, (e.g., "happy" or "warm"), the *causes of states* (e.g., "it's his birthday", "he is awake at night"), identifying the *link* between the state and cause (e.g., "scared *because* her mother is out") and the *expression* of the state (e.g., "can see that she's scared because she's crying"). It should be noted that children could be credited with a cause without identifying the state itself, for example a child identifying that it was the elephant's birthday but not explicitly stating he was happy because of this, was credited with a cause of state but not a state itself. Correct identification of *core* (e.g. "I drew a picture") and *non-core activities* (e.g. "I waved goodbye") performed with the animals was also credited, in addition to correct *naming* of the animals. Information that was not verbally labeled was also coded in relation to emotion-talk and non-emotion talk stations, namely the *description* of the animal (e.g., "it was orange") and the animal's *location* (e.g., "it was sitting on a chair").

Incorrect information relating to emotion talk and non-emotional talk was also coded. This was achieved through each of the information variables being given a *distortion* code, which referred to when children incorrectly reported information closely relating to one of the correct information variables.

Cohen's Kappa was used as a measure of reliability of the coding system as a whole. Three experimenters independently coded 21 (28%) of the interview transcripts. Inter-rater reliability was found to be excellent (Cohen's kappa = .81).

The TEC (Pons & Harris, 2000) was marked according to the system outlined by the developers (Pons et al., 2004). In the system, one point is assigned for each of the nine components that are answered correctly. In the sections on *Emotion Recognition*, and *Understanding of External Causes of Emotion*, children had to answer four out of five questions correctly to gain a point. For example, children had to correctly identify four out of five different facial expressions to pass the Emotion Recognition component of the TEC. For the *Desire* component of the TEC, children were required to correctly identify two opposing emotions relating to differing desires, in one of the two available mixed desire scenarios to pass this component. For all other components children were required to correctly answer all aspects of the questions to attain a point.

### Results

An alpha level of 0.05 was used for all statistical tests in these analyses. Before any formal statistical analyses were conducted, the normality of the data was investigated to ensure the appropriateness of statistical testing. The Kolmogorov-Smirnov test of normality indicated that the total correct information ( $D(74) = 0.10, p = 0.08$ ) and correct information reported in free recall ( $D(74) = 0.10, p = 0.09$ ) were normally distributed. Distortions reported in free ( $D(74) = 0.27, p < .001$ ) and total ( $D(74) = 0.22, p < .001$ ) recall were suggested to be non-normal, however. The non-normality of the distortion data was also supported by investigation of Q-Q plots. The non-normality of the distortion data was addressed in the analyses, as discussed in the errors section.

As there were four emotional stations and only two non-emotional stations in the event script, there was twice the quantity of emotional information that was possible to recall. To account for this, the amount of information recalled from emotional stations was divided by two,

and this mean was used for the comparison of information in the study. This enabled recall to be directly compared between information relating to emotion talk and non-emotional talk. Note that this procedure was also performed for erroneous information so it could be directly compared between emotional and non-emotional talk stations.

To ensure that the method of analyses was not adversely affecting the results; all analyses were also run with all information converted into proportions for comparison between stations. This was achieved by dividing the total information recalled by the total information possible to be recalled, for both emotional and non-emotional stations. These proportions were then compared. The same pattern of results was produced with this method of analysis.

#### *Recall of Correct Emotional and Non-Emotional Information*

To investigate the hypothesis that information from stations using emotion talk would be recalled better than information from non-emotional talk stations, a series of paired samples  $t$  tests were performed with both overall information recalled, and individual information variables.

Results from information reported in free recall are shown in Table 2. As shown by Table 2, children recalled more total information from emotion talk stations than non emotion talk stations in free recall. Of the specific information variables, there were significant differences in recall of names, states, state expressions, causes, state-cause links and activities, with children reporting more information from stations using emotion talk than non-emotional talk for these variables. There were not significant differences in recall of non-core activities, animal descriptions or locations.



Table 2.

*Comparison of Information from Emotion-Talk and Non-Emotional Talk Stations, in Free Recall*

Variable	Emotional Talk Station	Non Emotion Talk Station	<i>t</i> (74)	<i>p</i>
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
Total Information in				
Free Recall	5.47 (2.74)	2.72 (2.91)	7.42	<.001
Name	1.01 (0.46)	0.71 (0.61)	3.91	<.001
State	0.15 (0.27)	0.07 (0.03)	2.33	.02
State Expression	0.32 (0.63)	0.08 (0.32)	5.23	<.001
Cause	0.85 (0.74)	0.03 (0.16)	9.62	<.001
State-Cause Link	0.09 (0.23)	0.00 (0.00)	3.55	.01
Activity	2.63 (1.45)	1.45 (1.76)	4.92	<.001
Description	0.13 (0.36)	0.15 (0.43)	-0.36	.72
Location	0.23 (0.41)	0.21 (0.47)	0.24	.77

Paired samples *t* tests were also used to investigate total recall of information relating to emotion talk and non-emotional talk, that is, information from free and prompted recall combined. Children reported more total information from stations using emotion talk than stations using non-emotional talk in total recall. Regarding specific information variables, children recalled significantly more animal names, causes, state–cause links and activities when information was from an emotion talk station. This finding replicated that for information reported in free recall. Also similar to information reported in free recall was the finding that children did not differ in their recall of non-core activities and animal locations.

There were several differences in comparison to specific information variables reported in free recall, however. The previous advantage of states and state expressions related to emotion talk in free recall was not found in total recall. Furthermore, children reported significantly more

descriptions of animals from stations using non-emotional talk, than emotion talk stations.

Results are shown in Table 3.

Table 3.

*Comparison of Information from Emotion-Talk and Non-Emotional Talk Stations, in Total Recall*

Variable	Emotion Talk Station	Non-Emotion Talk Station	<i>t</i> (74)	<i>p</i>
	<i>M</i> ( <i>SD</i> )	<i>M</i> ( <i>SD</i> )		
Total Information in				
Total Recall	6.45 (2.74)	4.25 (3.29)	5.63	<.001
Name	1.01 (0.46)	0.71 (0.61)	3.91	<.001
State	0.20 (0.30)	0.21 (0.41)	-0.26	.80
State Expression	0.39 (0.37)	0.25 (0.64)	1.87	.07
Cause	1.00 (0.75)	0.03 (0.16)	11.26	<.001
State-Cause Link	0.13 (0.25)	0.03 (0.16)	3.50	.01
Activity	3.07 (1.52)	2.28 (2.12)	2.85	.01
Description	0.27 (0.51)	0.43 (0.81)	-2.07	.04
Location	0.30 (0.49)	0.28 (0.51)	0.30	.77
Non-core Activity	0.07 (0.32)	0.04 (0.26)	1.30	.20

#### *Reporting of Erroneous Information*

During normality testing it was noted that the distortion data was not normally distributed. Investigation of Q-Q plots indicated distortion data contained a number of significant outliers. Comparison of analyses conducted with the original dataset and when outliers were removed indicated that the outliers significantly affected the results. The outliers were subsequently removed from the dataset, and all distortions results refer to this adjusted data.

Investigation of the means of total (free and prompted) recall revealed that, as expected, errors were very infrequent in both emotional stations ( $M = 0.64$ ,  $SD = 0.68$ ) and non-emotional stations ( $M = 0.25$ ,  $SD = 0.52$ ).

Accuracy was calculated by dividing total correct information by total correct and incorrect information recalled. These calculations revealed that accuracy was high for recall of information relating to both emotional ( $M \text{ Accuracy} = 91\%$ ,  $SD = 10\%$ ) and non-emotional talk stations ( $M \text{ Accuracy} = 91\%$ ,  $SD = 18\%$ ). Consistent with expectations, the overall accuracy did not differ between types of talk ( $t(69) = 0.55$ ,  $p = .59$ ).

Taking into account the small number of errors and large standard deviations, together with the lack of differences in overall accuracy, errors were deemed inappropriate to be analyzed further.

#### *Influence of Emotion Knowledge on Correct Recall*

Children's scores on the Test of Emotion Comprehension (TEC; Pons & Harris, 2000) ranged between 2 and 8, out of 9 possible points. The distribution, while normal, was limited in its variability, as shown by the small standard deviation ( $M \text{ score} = 5.52$ ,  $SD = 1.39$ ).

Regression analyses were used to investigate the utility of emotion knowledge in prediction of children's recall. A simple regression revealed TEC score did not significantly predict children's total recall of all elements of the event ( $\beta = .11$ ,  $t(74) = 0.98$ ,  $p = .33$ ). To further investigate the effect of emotion knowledge on recall, information was divided into its separate stations. Simple regressions revealed that TEC score did not predict children's recall of total information from emotion-talk stations ( $\beta = .12$ ,  $t(74) = 1.03$ ,  $p = .31$ ) or non-emotion talk stations ( $\beta = .07$ ,  $t(74) = 0.64$ ,  $p = .53$ ).

Of note is that comparison of scores divided by a medium split was also considered for analysis of the influence of emotion knowledge on recall. This was deemed inappropriate, however, due to the small spread of scores leading to uneven group sizes and contrasting results depending on which group (high or low) that children with the median score were placed.

### Discussion

The current study compared children's recall of information from stations using either emotion talk or non-emotional talk, and the utility of emotion knowledge in the prediction of children's recall. While initial research supports a beneficial effect of emotion talk on memory for information (Davidson et al., 2001; van Bergen & Salmon, in press), these studies have not controlled for causal relationships within emotional and non-emotional information. Semantic relatedness, that is, the degree of relatedness in meaning of the text, has also been highlighted as an important factor to control for when comparing recall of information. Control of these two factors is critical as they are associated with improved recall, and importantly, are more often associated with emotional than non-emotional information (Bauer & Mandler, 1989; Talmi & Moscovitch, 2004).

In addition, emotion knowledge has been shown to relate to recall of personal information (Wang, 2008; Wang et al., 2006) and emotional and non-emotional information, relating to an emotional theme (van Bergen and Salmon, in press). Of interest is whether this finding can be replicated with a more comprehensive test of emotion knowledge. It is also beneficial to further the finding that emotion knowledge predicts emotional and non-emotional information, particularly, whether predictive ability remains when non-emotional information is distinct from the emotional information in theme.

The research questions described above were addressed in the current study, through the participation of 5-6 year old children in a staged event, “Visiting the Pretend Zoo”. During the event children were introduced to toy animals at individual stations, where experimenters used either emotion talk or non-emotional talk. Both types of talk involved description of causal relationships, and semantically related information and activities of a related theme. Information variables were individually coded and compared, specifically *name*, *state*, *state expression*, *cause*, *state-cause link*, *activity*, *location*, *description* and *non-core activity* variables; where states referred to an emotional or physical state, according to whether they related to an emotion talk or non-emotional talk station. Children’s emotion knowledge was tested using the Test of Emotion Comprehension (TEC; Pons & Harris, 2000), and its relationship to children’s recall was investigated. The major findings and theoretical implications are discussed below.

*Did Children Recall More Information from Emotional than Non-emotional Stations?*

Results revealed that overall, children recalled more information from stations where emotion talk was used than from stations where non-emotion talk was used. This advantage was not found in each of the individual information variables, however. The main finding, of an advantage in recall of information from emotion talk stations, will firstly be discussed. Following this a brief discussion on the differences in individual information variables will be made.

*Overall Recall.*

In line with expectations, the current study revealed a memory advantage for information from stations which featured emotion talk, in comparison to non-emotion talk stations.

Children's overall recall of information from stations using emotion talk was superior in both free and total (free and prompted) recall.

The main finding of an advantage of emotion talk supports similar findings of previous studies (Davidson et al., 2001; van Bergen & Salmon, in press). Of particular value is that the current finding suggests the advantage of emotion talk for children's recall of an event is independent of the effect of causality and semantic relatedness of information. In the current study, these factors were matched across stations by ensuring both types of information contained causal relationships of equal strength, and equally interrelated and structured information to form coherent stories of either an emotional or non-emotional theme. Therefore, the current study enables the conclusion that children recall information relating to emotion talk better than non-emotional talk information, purely because of the emotion content of the material.

There are a number of related explanations contributing to the finding that information relating to emotion talk is better recalled than information relating to non-emotional talks.

Firstly, it is likely that emotion talk is more salient to children because of the personal relevance that can accompany it, including relevance to personal goals. Indeed, while the current study concerned states and activities that were designed to be relatively familiar to children whether of an emotional or non-emotional theme, the personal quality of this information may have differed between emotional and non-emotional stations. Specifically, while the non-emotional states used in the study (being too hot and needing to go to sleep) were likely to have been experienced by children, the emotional states used (e.g., being scared because a parent was

out) may have had more personal significance. Furthermore, these states may have borne a closer relationship to general goals held by children regarding personal safety and wellbeing. Critically, personally relevant and goal-related information typically displays an advantage in memory due to this greater personal significance (Levine & Edelstein, 2009).

In fact, observations during interviewing indicated that children were drawing on personal experiences during recall of emotional information. For example it was noted that children would frequently provide additional details not in the script when describing the mouse being scared, for example that the mouse “did not know the babysitter” or that “Daddy was away on business”. In contrast, elaborations of this nature were not observed during recall of non-emotional information. These observations support the assertion that the emotional information had greater personal relevance to children. The observation that children were drawing on personal experiences in recall is also important, as personal experiences can be used as a foundation from which to comprehend and form expectations about an event. Critically, this process improves recall (Levine & Edelstein, 2009). Thus, it is posited that this greater personal relevance of emotional information, including greater relevance to personal goals, rendered the information more memorable to children.

Also of note is that this heightened personal relevance was likely to have generated an empathic response in children, towards toy animals “experiencing” an emotional state. The process of understanding story characters’ emotions often includes imaging how oneself would feel if put in similar circumstances (Ames, Jenkins, Banaji & Mitchell, 2008), and the fact that children were recalling what appeared to have been personal experiences suggests children were

indeed empathizing with the animals featuring emotional states. This is of particular note as Bourg and colleagues have documented a beneficial effect of empathizing with story characters on understanding of information (Bourg, Risdén, Thompson & Davis, 1993). In their study, 6<sup>th</sup> grade children (ages 11-12 years) were instructed to read two stories featuring emotional content aloud. Children in the empathy-building condition were told to imagine what it would be like in the character's positions and how they themselves would feel. They were also instructed to use their tone of voice to express their feelings when reading the story. In contrast, children in the no-empathy condition were simply instructed to read the story aloud. Results revealed that when the text contained a relatively large number of major causal connections and outcomes, children who empathized with the story characters had a greater understanding of the causal relations in the story. As previously noted, information connected by causal relations is better recalled than arbitrarily connected information (Bauer & Mandler, 1989); therefore this increased understanding of emotion-related causal relations in the story would have had a beneficial effect on children's comprehension and memory for this information.

Furthermore, Bourg (1996) argued that empathetic responding to story characters motivates individuals to attend to goals and outcomes for the protagonist and determine relations among events, which is also likely to facilitate remembering. The phenomenon of empathic responding enhancing memory has been termed thematically induced arousal (Laney, Heuer, & Reisberg, 2003) and has also been demonstrated to facilitate recall in adults (Hulse, Allan, Memon, & Read, 2007; Laney, Campbell, Heuer, & Reisberg, 2004). It is posited that only



animals presented using emotion talk triggered children's empathetic responding, which in turn benefited their memory for information from emotion talk, but not non-emotion talk stations.

In summary, the main finding is argued to be the result of a number of related factors. These feature on the increased personal relevance that emotional information has for children, including a greater relationship with personal goals. This increased personal significance is asserted to have enhanced the memorability of information from emotion talk stations, in comparison with non-emotion talk stations, which would not have received the memory benefits of enhanced personal relevance. It is also argued that emotional, but not non-emotional information was likely to trigger children's empathic responding, which has been further benefits on recall. In combination these factors rendered information from emotion talk stations more memorable to children than information from non-emotion talk stations, thus accounting for the main finding of this study.

#### *Components of Correct Recall.*

Specific information variables were also compared between emotional and non-emotional stations. Of these, children better recalled emotion talk-related names (e.g. "mouse"), causes (e.g. "her mother was out"), state-cause links (e.g. "scared *because* her mother is out"), and activities (e.g. "I drew a picture") in both free and total recall, and states (e.g. "scared") and state expressions (e.g., "crying"), in free recall.

Interestingly, and contrary to expectations, the memory advantage of information from emotion talk stations was not uniform. Specifically, *description*, (e.g. "she wore a t-shirt") *location* (e.g. "she was sitting on a chair") and *non-core activities* (e.g. "I waved goodbye")

information did not display a memory advantage for stations where emotion talk was used. This contrasts with the findings of van Bergen and Salmon (in press), who found that children who engaged in emotional reminiscing recalled more information of both emotional and non-emotional content from a staged event.

The most likely explanation for this finding lies in the degree of relationship with the theme of the station. Description, location and non-core activity information variables from emotion-talk stations did not, in themselves, relate to the emotional state. The advantage in recall of emotion talk information has been explained above in terms of its greater personal relevance including relationship with goal states, and the increase in empathic responding that emotion talk generates; all of which aid recall. In contrast, description, location and non-core activity variables did not explicitly relate to the emotional theme of the story so would not have received these beneficial effects on recall.

It was previously noted that the current study's finding contrasts with that of van Bergen and Salmon (in press), who found that children who engaged in emotional reminiscing better recalled both emotional and non-emotional aspects of an event. Investigation of that study's event script, however, highlights that information defined as non-emotional may still have been likely to illustrate the emotions of the protagonist. For example, recall of a monkey who was excited because it was his birthday having *his arms up in the air* was considered non-emotional information. This information can plausibly relate to emotional theme of excitement, however, or the dance that children performed with the monkey. An inherent relation of "non-emotional" information with emotional material in the script may therefore have accounted for their finding.

In contrast, non-emotional stations bore no relationship to emotional themes in the current study's script, therefore would not have received the benefits on recall for information relating to emotional content, discussed above. Thus this interpretation of van Bergen and Salmon's non-emotional information lends support to the suggestion that non-emotional information is better recalled by children when it is plausibly related to information of an emotional theme.

In summary, the results from the comparison of correct recall of information from stations using either emotional or non-emotional talk indicate there is a memory advantage for information relating to emotion talk, specifically, when the information is related to an emotional theme. This advantage in recall is argued to be the result of emotional information having greater personal and goal relevance to children, also facilitating empathetic responding. Through this increased relevance and thematically-induced arousal, information relating to an emotional theme was rendered more memorable.

#### *Did Emotion Talk effect Children's Erroneous Recall?*

The second major finding of the current study regarded erroneous information reported by children. Interestingly, children made very few errors, and total accuracy did not differ between emotion talk and non-emotion talk stations. This high level of accuracy was also found in van Bergen and Salmon (in press).

In light of the lack of difference in accuracy and the extremely small numbers of total errors, errors are not considered further.

### *Did Emotion Knowledge Predict Children's Recall?*

The third major finding concerns the effect of emotion knowledge on recall. Contrary to expectations, emotion knowledge did not predict recall of emotion talk information, non-emotion talk information or total information overall. This is in contrast to the findings of other studies that emotion knowledge predicts recall (Wang, 2008; Wang et al., 2006; van Bergen & Salmon, in press). A number of factors may have contributed to this result.

It is likely the explanation for the finding may lie in the use of the Test of Emotion Comprehension (TEC; Pons & Harris, 2000) as a measure of emotion knowledge in the current study. Earlier studies finding that emotion knowledge predicts recall instead employed an Emotion Production task as a measure of emotion knowledge, where children were asked to provide situations likely to cause happy, sad, angry or fearful emotions (van Bergen & Salmon, in press; Wang, 2008; Wang et al., 2006). An emotion judgment task requiring children to indicate the emotion that a story protagonist would feel has also been used (Wang et al., 2006). In contrast to the measures used in previous studies which concerned a specific component of emotion knowledge, the TEC comprises nine components of emotion knowledge. Importantly, each of these components is given equal weight towards a child's final score. It is therefore possible that a child's ability to recall emotional information is predicted by specific components of emotion knowledge, but not emotion knowledge as a whole as viewed by Pons and Harris (2000).

Of note for this interpretation is that in previous research the positive influence of emotion knowledge is suggested to be the result of an increased ability to provide meaning and

structure to an emotional event, and therefore better organize and represent it in memory (Wang, 2008). Therefore, skills specifically involving the ability to understand what kind of situations lead to particular emotions may benefit children's recall of emotion-causing situations, such as those found in the personal (Wang, 2008; Wang et al., 2006) and staged (van Bergen & Salmon, in press) events investigated. The skills such as understanding *morality*, *mixed feelings* and *desire* – components of emotion knowledge measured by the TEC – may be less likely to contribute to children's overall understanding of an emotional event. The fact that in the current study children's emotion knowledge score equally reflected nine varying components may have accounted for the findings, as the more broad measure of emotion knowledge may have led to a reduction in ability to predict children's recall.

Also likely to have contributed to the finding is that the results revealed there was limited variation in children's TEC scores, as shown by the small standard deviations. Limited variance in predictor values is a constraint upon a regression model (Field, 2009). Thus the small variance in children's scores may have prevented any utility of the TEC in predicting children's recall based on their emotion knowledge.

Finally, it should be noted that no research to date could be found investigating the TEC's concurrent validity, that is, its correlation with other validated measures of emotion knowledge. The TEC may in fact correlate only slightly with other measures, particularly as researchers and measures have tended to focus on a specific component of emotion knowledge (de Rosnay, Pons & Harris, 2008).

In summary, several factors may have contributed to the finding that TEC score did not predict children's recall. These explanations centre on the limited variability in scores for the sample and the fact that TEC measures a number of components of emotion knowledge, not all of which may be related to improved recall, thus further constraining the ability of the TEC to predict recall. Unfortunately the suggestion that specific components of emotion knowledge may individually predict children's recall could not be specifically investigated in the current study due to the limited variability in children's scores. This remains a topic for future research.

### *General Discussion*

The current study has offered a detailed and valuable comparison of children's correct and incorrect recall of information from stations using emotional or non-emotional talk. It has also investigated the impact of children's emotion knowledge on this recall.

Limitations must be noted. Firstly, the study design enabled a separate investigation of the relationship between recall of positive and negative information through having an equal number of positive emotional, negative emotional and non-emotional stations. The current study focused on the comparison of emotional and non-emotional information, however; this created a potentially problematic doubling in quantity of emotional information in the script. The greater quantity of emotional than non-emotional information was accounted for when analyzing the data by using the mean of children's recall of emotional information. It remains possible, however, that the greater number of emotional stations in the event may have in itself increased the salience of the emotion-related information. The effect of this, if any, is suggested to be small as each station was distinct and unrelated to other stations. To allow even greater certainty about

the relationship to recall, however, it would be beneficial for future studies to contain the same total quantity of emotional and non-emotional information. This would ensure the findings reflect purely the difference in types of information.

Further questions stem from the current findings. The findings of this study suggest that the memory benefits of emotion knowledge may be restricted to certain components of this understanding, not emotion knowledge as a whole. In alternative studies where emotion knowledge has been shown to predict recall, it is children's ability to judge and suggest emotion causes that has been measured. It is possible that only these components of children's emotion knowledge predict recall, as this specific understanding alone may enable children to provide an increased structure and meaning to emotional events, thus better retaining them in memory. This suggestion warrants further investigation to fully understand the impact of emotion knowledge on memory.

Questions also remain regarding the potentially differing effect of emotion knowledge in prediction of recall of emotional and non-emotional talk information. The current study attempted to investigate this issue, however was unable to as the TEC (Pons & Harris, 2000) did not predict recall of talk information of either type. It would be beneficial for future studies to readdress this issue, potentially through the use of a measure involving a specific component of emotion knowledge.

The current study found that children better recalled information from stations where emotion talk was used, when the information was closely related to an emotional state. In contrast, information from a station where emotion talk was used but the information in itself did

not bear a relationship to an emotion, did not show a benefit for recall. Critically, this benefit found for emotion-related talk was shown to be independent of the memory benefits of causality and interrelatedness of information, factors that have may have confounded previous studies.

The findings of this study have important implications for conversations about emotions. It has been demonstrated by the current study that talk about emotions with children has a greater impact on children's memory than talk not centered on emotions. This effect is found when the emotions described are attributed to an entity separate from the child themselves. The fact that emotion-orientated talk is particularly held in children's memory highlights a pathway through which children may learn about emotions. Children better recalled information relating to emotions, including the causes of the emotion, the explicit link between an emotion and a cause, and activities related to emotions that implied a future, resolving emotional state. This emotion information in particular may benefit children's developing understanding of emotions, emotion causes and how to resolve these emotions. In fact, greater recall of events where an emotion is experienced, the cause of the emotion is highlighted and activities are performed to resolve the emotional state specifically would arguably *most* strongly benefit children in their developing understanding of emotions, causes and emotion management strategies. Thus findings from the current study suggest that children better recalled the precise information that would most strongly benefit children's developing understanding of emotions and subsequent ability to function successfully in their emotional world.

In summary, the current study has met three overarching aims. Firstly, a detailed comparison has been made between children's recall of information relating to emotion talk or



non-emotional talk, controlling for factors that may have confounded the results of previous studies. The results showed that children's recall of information from stations featuring emotion talk was superior when the information itself was related to an emotional state. The memory benefit has been explained in terms of the enhanced personal relevance including greater relationship with personal goals, and increase in empathetic responding that emotional information creates in children. These factors improve recall of emotion talk information. It has also been highlighted that children best remember information that has tangible benefits for their developing emotion knowledge.

Secondly, children's overall accuracy has been shown to be equally high when recalling information from stations using emotional and non-emotional talk.

Finally, emotion knowledge was not found to predict children's recall in the current study. This finding was interpreted to be primarily the result of the use of a broad measure of emotion knowledge, also contributed to by the lack of variability in children's scores. The need for further research investigating what specific aspects of emotion knowledge predict recall has been highlighted.

In conclusion, talk about emotions with children is held strongly and accurately in their memory. Children best remember the very information that is most useful to their developing emotional understanding; information about emotions, causes and resolutions. Through the current study, a pathway through which children's emotion knowledge may develop has been highlighted - knowledge that will have profound benefits across the lifespan.

## References

- Ames, D. L., Jenkins, A. C., Banaji, M. R., & Mitchell, J. P. (2008). Taking another person's perspective increases self-referential neural processing. *Psychological Science, 19*(7), 642-644.
- Anooshian, L., & Hertel, P. (1994). Emotionality in free recall: Language specificity in bilingual memory. *Cognition & Emotion, 8*, 503-514.
- Bauer, P. J., & Burch, M. (2004). Developments in early memory: Multiple mediators of foundational processes. In Lucariello, J., Hudson, J., Fivush, R., & Bauer, J. (Eds.), *The Development of the Mediated Mind* (pp. 101–125). Mahwah, NJ: Erlbaum.
- Bauer, P. J., & Mandler, J. M. (1989). One thing follows another: The effects of temporal structure on 1- to 2- year old's recall of events. *Developmental Psychology, 25*(2), 197-206.
- Boland, A. M., Haden, C. A., & Ornstein, P. A. (2003). Boosting children's memory by training mothers in the use of an elaborative conversation style as an event unfolds. *Journal of Cognition and Development, 4*(1), 39-65.
- Bourg, T. (1996). The role of emotion, empathy, and text structure in children's and adults' narrative text comprehension. In R. J. Kreuz and M. S. MacNealy (Eds.), *Empirical approaches to literature and aesthetics* (pp. 241-260). Westport, CT: Ablex Publishing.
- Bourg, T., Risdien, K., Thompson, S., & Davis, R. C. (1993). The effects of an empathy-building strategy on 6th graders' causal inferencing in narrative text comprehension. *Poetics, 22*(1-2), 117-133.

- Cassidy, K. W., Werner, R. S., Rourke, M., Zubernis, L. S., & Balaraman, G. (2003). The relationship between psychological understanding and positive social behaviors. *Social Development, 12*(2), 198-221.
- Colombel, F. (2000). The processing of emotionally positive words according to the amount of accessible retrieval cues/Traitement de concepts à connotation émotionnelle positive selon la quantité d'indices de récupération accessibles. *International Journal of Psychology, 35*, 279-286.
- Davidson, D., Luo, Z., & Burden, M. (2001). Children's recall of emotional behaviours, emotional labels, and nonemotional behaviours: Does emotion enhance memory? *Cognition and Emotion, 15*, 1-26.
- Denham, S., Blair, K., DeMulder, E., Levitas, J., Sawyer, K., Auerbach-Major, S., et al. (2003). Preschool emotional competence: Pathway to social competence? *Child Development, 74*, 238-256.
- Denham, S., Zoller, D., & Couchoud, E. (1994). Socialization of preschoolers' emotion understanding. *Developmental Psychology, 30*, 928-936.
- de Rosnay, M., Pons, F., & Harris, P. (2008). Perché il Test di Comprensione delle Emozioni (TEC). In O Albanese & P. Molina, Lo sviluppo della comprensione delle emozioni e la sua valutazione: La standardizzazione italiana del Test de Comprensione delle Emozioni (TEC) (pp. 9-17). Milano: Edizioni Unicopli.
- Doerksen, S., & Shimamura, A. P. (2001). Source memory enhancement for emotional words. *Emotion, 1*, 5-11.
- Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling states and children's later understanding of others' emotions. *Developmental Psychology, 27*(3), 448-455.

- Farrant, K., & Reese, E. (2000). Maternal style and children's participation in reminiscing: Stepping stones in children's autobiographical memory development. *Journal of Cognition and Development, 1*, 193–225.
- Field, A. (2009). *Discovering Statistics using SPSS* (3rd ed.). London: Sage Publications.
- Field, A. P., Argryris, N. G., & Knowles, K. A. (2001). Who's afraid of the big bad wolf: A prospective paradigm to test Rachman's indirect pathways in children. *Behaviour Research and Therapy, 39*(11), 1259-1276.
- Field, A. P., & Lawson, J. (2003). Fear information and the development of fears during childhood: effects on implicit fear responses and behavioural avoidance. *Behaviour Research and Therapy, 41*(11), 1277–1293.
- Field, A. P., & Lawson, J. (2008). The verbal information pathway to fear and subsequent causal learning in children. *Cognition and Emotion, 22*, 459-479.
- Field, A. P., Lawson, J., & Banerjee, R (2008). The verbal threat information pathway to fear in children: The longitudinal effects on fear cognitions and the immediate effects on avoidance behaviour. *Journal of Abnormal Psychology, 117*, 214-224.
- Fivush, R. (2007). Maternal reminiscing style and children's developing understanding of self and emotion. *Clinical Social Work Journal, 35*, 37- 46.
- Fivush, R., Haden, C., & Reese, E. (2006). Elaborating on elaborations: Role of maternal reminiscing style in cognitive and socioemotional development. *Child Development, 77*, 1568–1588.
- Fivush, R. & Vasudeva, A. (2002). Remembering to relate: Socioemotional correlates of mother-child reminiscing. *Journal of Cognition and Development, 3*, 73–90.

- Frazier, B. N., Gelman, S. A., & Wellman, H. M. (2009). Preschoolers search for explanatory information within adult-child conversation. *Child Development, 80*(6), 1592-1611.
- Haden, C., Ornstein, P., Eckerman, C., & Didow, S. (2001). Mother-child conversational interactions as events unfold: Linkages to subsequent remembering. *Child Development, 72*, 1016-1031.
- Harley, K., & Reese, E. (1999). Origins of autobiographical memory. *Developmental Psychology, 35*(5), 1338-1348.
- Howe, M. (2007). Children's emotional false memories. *Psychological Science, 18*, 856-860.
- Hulse, L. M., Allan, K., Memon, A., & Read, J. D. (2007). Emotional arousal and memory: Test of the poststimulus processing hypothesis. *American Journal of Psychology, 120*(1), 73-90.
- Izard, C. E., King, K. A., Trentacosta, C. J., Morgan, J. K., Laurenceau, J.-P., Krauthamer-Ewing, E. S., et al. (2008). Accelerating the development of emotion competence in head start children: Effects on adaptive and maladaptive behaviour. *Development and Psychopathology, 20*, 369-397.
- Kensinger, E. A., Brierley, B., Medford, N., Growdon, J. H., & Corkin, S. (2002). Effects of normal aging and Alzheimer's disease on emotional memory. *Emotion, 2*, 118-134.
- LaBar, K. S., & Phelps, E. A. (1998). Arousal-mediated memory consolidation: Role of the medial temporal lobe in humans. *Psychological Science, 9*, 490-493.
- Laible, D. (2004). Mother-Child discourse in two contexts: Links with child temperament, attachment security, and socioemotional competence. *Developmental Psychology, 40*(6), 979-992.

- Lamb, M.E., Orbach, Y., Hershkowitz, I., Esplin, P.W., & Horowitz, D. (2007). A structured forensic interview protocol improves the quality and informativeness of investigative interviews with children: A review of research using the NICHD investigative interview protocol. *Child Abuse and Neglect*, 31(11-12), 1021-1231.
- Laney, C., Campbell, H., Heuer, F., & Reisberg, D. (2004). Memory for thematically arousing events. *Memory & Cognition*, 32(7), 1149-1159.
- Laney, C., Heuer, F., & Reisberg, D. (2003). Thematically-induced arousal in naturally occurring emotional memories. *Applied Cognitive Psychology*, 17(8), 995-1004.
- Leichtman, M., Pillemer, D., Wang, Q., Koreishi, A., & Han, J. (2000). When Baby Maisy came to school: Mothers' interview styles and preschoolers' event memories. *Cognitive Development*, 15, 99-114.
- Levine, L. J., & Edelstein, R. S. (2009). Emotion and memory narrowing: A review and goal-relevance approach. *Cognition and Emotion*, 23(5), 833-875.
- Low, J., & Durkin, K. (2001). Individual differences and consistency in maternal talk style during joint story encoding and retrospection: Associations with children's long-term recall. *International Journal of Behavioral Development*, 2, 27-36.
- Maughan, B., Jessor, J., Collishaw, S., Pickles, A., Snowling, M., Yule, W., et al. (2009). Persistence of literary problems: Spelling in adolescence and at mid-life. *Journal of Child Psychology and Psychiatry*, 50(8), 893-901.
- McGuigan, F., & Salmon, K. (2004). The Time to talk: The influence of the timing of adult-child talk on children's event memory. *Child Development*, 75(3), 669-686.
- Mostow, A., Izard, C., Fine, S., & Trentacosta, C. (2002). Modeling emotional, cognitive, and behavioral predictors of peer acceptance. *Child Development*, 73(6), 1775-1787.

- Muris, P., Bodden, D., Merckelbach, H., Ollendick, T., & King, N. (2003). Fear of the beast: A prospective study on the effects of negative information on childhood fear. *Behaviour Research and Therapy*, 41(2), 195-208.
- Murphy, N., & Isaacowitz, D. (2008). Preferences for emotional information in younger and older adults: A meta-analysis of memory and attention tasks. *Psychology and Aging*, 23, 263-286.
- Nelson, K., & Fivush, R. (2004). The emergence of autobiographical memory: A social cultural developmental theory. *Psychological Review*, 111, 486-511.
- Orbach, Y., Hershkowitz, I., Lamb, M., Sternberg, K., Esplin, P., & Horowitz, D. (2000). Assessing the value of structured protocols for forensic interviews of alleged child abuse victims. *Child Abuse & Neglect*, 24, 733-752.
- Ornstein, P. (2008). The development of skilled remembering in children. In H. Roediger (Ed.), *Cognitive Psychology of Memory*, (pp. 715-744) Oxford: Elsevier.
- Peterson, C., Jesso, B., & McCabe, A. (1999). Encouraging narratives in preschoolers: An intervention study. *Journal of Child Language*, 26, 49-67.
- Phelps, E. A., LaBar, K. S., & Spencer, D. D. (1997). Memory for emotional words following unilateral temporal lobectomy. *Brain & Cognition*, 35, 85-109.
- Pons, F., & Harris, P. (2000). *Test of Emotion Comprehension – TEC*. Oxford: University of Oxford.
- Pons, F., Harris, P. L., & Doudin, P. A. (2002). Teaching emotion understanding. *European Journal of Psychology of Education*, 17(3), 293-304.

- Pons, F., Harris, P. L., & de Rosnay, M. (2004). Emotion comprehension between 3 and 11 years: Developmental periods and hierarchical organisation. *European Journal of Developmental Psychology, 1*, 127-152.
- Pons, F., Lawson, J., Harris, P., & de Rosnay, M. (2003). Individual differences in children's emotion understanding: Effects of age and language. *Scandinavian Journal of Psychology, 44*(4), 347-353.
- Reese, E., Haden, C., & Fivush, R. (1996). Mothers, father, daughters, sons: Gender differences in autobiographical reminiscing. *Research on Language and Social Interaction, 29*, 27-56.
- Reese, E., & Newcombe, R. (2007). Training mothers in elaborative reminiscing enhances children's autobiographical memory and narrative. *Child Development, 78*(4), 1153-1170.
- Rutter, M. (1996). Connections between child and adult psychopathology. *European Child and Adolescent Psychiatry, 5*(1), 4-7.
- Sternberg, K. J., Lamb, M. E., Orbach, Y., Esplin, P. W., & Mitchell, S. (2001). Use of a structured investigation protocol enhances young children's responses to free-recall prompts in the course of forensic interviews. *Journal of Applied Psychology, 86*(5), 997-1005.
- Suzuki, T. (2004). Relationship between word emotionality and consciousness of retrieval process in memory. *Japanese Journal of Psychology, 75*, 59-65.
- Talmi, D., & Moscovitch, M. (2004). Can semantic relatedness explain the enhancement of memory for emotional words? *Memory & Cognition, 32*(5), 742-751.



- Tapiero, I., van den Broek, P., & Quintana, M. –P. (2002). The mental representation of narrative texts as networks: The role of necessity and sufficiency in the detection of different types of causal relations. *Discourse Processes*, 34(3), 237-258
- Tenenbaum, H., Visscher, P., Pons, F., & Harris, P. (2004). Emotion understanding in Quechua children from an agro-pastoralist village. *International Journal of Behavioral Development*, 28(5), 471-478.
- Tessler, M., & Nelson, K. (1994). Making memories: The influence of joint encoding on later recall by young children. *Consciousness and Cognition*, 3, 307–326.
- Wang, Q. (2008). Emotion knowledge and autobiographical memory across the preschool years: A cross-cultural longitudinal investigation. *Cognition*, 108, 117-135.
- Wang, Q., Hutt, R., Kulkofsky, S., McDermott, M., & Wei, R. (2006). Emotion situation knowledge and autobiographical memory in Chinese, Immigrant Chinese, and European American 3- year olds. *Journal of Cognition and Development*, 7, 95-118.
- Welch-Ross, M. (2001). Personalizing the temporally extended self: Evaluative self-awareness and the development of autobiographical memory. In Moore, C., & Skene, K. (Eds.), *The Self in Time: Developmental Issues*, (pp. 97–120). Mahwah, NJ: Erlbaum.
- Van Bergen, P., & Salmon, K. (In press). Emotion-orientated reminiscing and children's recall of a novel event. *Cognition & Emotion*

## Appendix A Principal Information Letter

### **Children's Memory for Mild Emotional and Non-Emotional Information: How it is associated with children's temperament and understanding of emotion**

Dear Principal,

We are conducting a study that is looking at children's memory for emotional and non-emotional information. We would like to invite children attending your kindergarten, aged 3 years, to participate in this study. This has been approved by the Victoria University Human Ethics Committee.

#### **What is the purpose of this research?**

- There are two components to this study. Firstly, we are interested in investigating whether children better remember information that is mildly emotional or information that is neutral (both positive and negative). Second, we are interested in whether children's temperament (for example, whether they are shy or outgoing) and their knowledge of basic emotions influences the type of information that they remember about an event. Studies such as this can provide important information about individual differences that shape children's developing understanding of the world.

#### **Who is conducting the research?**

- This research is being conducted by researchers from the School of Psychology at Victoria University, Wellington. Katherine Mackay and Janelle McIvor are undertaking this study under the supervision of Dr Karen Salmon. The research will be used to complete two Masters Theses.

#### **What is involved if your students participate in this study?**

- The children will be seen individually at kindergarten.
- Each child will first participate in a staged event involving "Visiting the pretend Zoo". We will give each child information about animals (e.g. the panda); an example of the statements given is "The panda is happy because there are lots of animals to play with". The event will take approximately 5 minutes.
- One week later, we will interview the children about their memory for the event. They will also undertake a short questionnaire about their understanding of emotions. The interview and questionnaire will take approximately 20 minutes in total.
- The children can withdraw by saying that they do not wish to proceed at any stage of the study.
- Parents will be asked to complete a questionnaire asking how their child would respond in specific situations.
- Dr Karen Salmon has used events like these in many previous studies. We know the children are keen to participate and find the experience enjoyable.

#### **Privacy and Confidentiality**

- Consent forms and data from the study will be kept for five years after publication.

- The data will be coded by numbers and therefore, data of the children will never be identified.
- Coded data may be shared with other competent professionals upon request.
- The data of the children may be used in other studies.
- The coded data of the children will be securely stored in the laboratory of Dr Karen Salmon.

**What happens to the information that you provide?**

- We may publish the results of the study in a scientific journal or present them in a conference. For both publication and theses, no child will be identified in the results and will remain confidential.
- The overall findings will form part of two Master's Theses, which will be submitted for assessment.

The results of the study will be available approximately January 2010. A summary of the results will be sent out to you upon completion.

If you have any further questions regarding this study, you are most welcome to contact the supervisor of this study, Dr Karen Salmon, ph 463 9528 or [Karen.Salmon@vuw.ac.nz](mailto:Karen.Salmon@vuw.ac.nz).

Thank you for your time in considering participating in this study.

Yours sincerely,

Janelle McIvor (Masters student)

Katherine Mackay (Masters student)

Karen Salmon, PhD., Dip.Clin.Psych  
Senior Lecturer in Psychology

## Appendix B

### Parent Information Letter and Consent Form

#### **Children's Memory for Mild Emotional and Non-Emotional Information: How it is associated with children's temperament and understanding of emotion**

Dear Parent/ Caregiver,

We are conducting a study that is looking at children's memory for emotional and non-emotional information. We would like to invite your child, if born between January 1<sup>st</sup> 2003 and June 1<sup>st</sup> 2004 (aged 5 - 6.5 years), to participate in this study. This has been approved by the Victoria University Human Ethics Committee.

#### **What is the purpose of this research?**

- There are two components to this study. Firstly, we are interested in investigating whether children better remember information that is mildly emotional (both positive and negative) or information that is neutral. Secondly, we are interested in whether children's temperament (for example, whether they are shy or outgoing) and their knowledge of basic emotions influences the type of information that they remember about an event. Studies such as this can provide important information about individual differences that shape children's developing understanding of the world.

#### **Who is conducting the research?**

- This research is being conducted by researchers from the School of Psychology at Victoria University, Wellington. Katherine Mackay and Janelle McIvor are undertaking this study under the supervision of Dr Karen Salmon. The research will be used to complete two Masters Theses.

#### **What is involved if you and your child participate in this study?**

- Your child will be seen individually at school.
- Your child will first participate in a staged event involving "Visiting the pretend Zoo". We will give each child information about animals (e.g. the panda); an example of the statements given is "The panda is happy because there are lots of animals to play with". The event will take approximately 5 minutes.
- One week later, we will interview your child about their memory for the event. Children will also undertake a short questionnaire about their understanding of emotions. The interview and questionnaire will take approximately 20 minutes in total.
- Your child can withdraw by saying that they do not wish to proceed at any stage of the study.
- You will be asked to complete a questionnaire asking how your child would respond in specific situations. This will be emailed or posted to you depending on your preference.
- Dr Karen Salmon has used events like these in many previous studies. We know the children are keen to participate and find the experience enjoyable.

### **Privacy and Confidentiality**

- Interviews will be audio recorded then transcribed for data analysis. The data will be coded by numbers and therefore, data of your child will never be identified.
- Consent forms and data from the study will be kept for five years after publication.
- Coded data may be shared with other competent professionals upon request.
- The data of your child may be used in other studies.
- The coded data of your child will be securely stored in the laboratory of Dr Karen Salmon.

### **What happens to the information that you provide?**

- We may publish the results of the study in a scientific journal or present them in a conference. For both publication and theses, no child will be identified in the results and will remain confidential.
- The overall findings will form part of two Master's Theses, which will be submitted for assessment.

The results of the study will be available approximately January 2010. A summary of the results will be sent out to you upon completion.

If you have any further questions regarding this study, you are most welcome to contact the supervisor of this study, Dr Karen Salmon, ph 463 9528 or [Karen.Salmon@vuw.ac.nz](mailto:Karen.Salmon@vuw.ac.nz).

If you agree for you and your child to participate in this study, please return this consent form to your child's teacher.

Thank you for your time in considering participating in this study.

Yours sincerely,

Janelle McIvor (Masters student)

Katherine Mackay (Masters student)

A handwritten signature in black ink, appearing to read 'Karen Salmon'.

Karen Salmon, PhD., Dip.Clin.Psych  
Senior Lecturer in Psychology

**Statement of Consent**

I have read all the information above and have asked any questions relating to this study, which have been answered satisfactorily.

I consent to the participation of my child in this research. I understand that my child can withdraw from this study at any point prior to the end of the study.

I would like the questionnaire sent to me by:

- ☐ post with a self-addressed stamped envelope, or
- ☐ email

Parents Name: .....

Child's Name: .....

Child's Date of Birth: .....

Address: .....

Email Address: .....

Phone Number: .....

Signature: .....

Date: .....

Appendix C1

Photograph of Crocodile and Teddy Props



Appendix C2

Photograph of Hippo and Blanket Props





Appendix C3

Photograph of Cheetah and Friend Prop



Appendix C4

Photograph of Elephant and Present Prop



Appendix C5

Photograph of Lamb Prop



Appendix C6

Photograph of Mouse Prop



Appendix C7

Photograph of Zookeeper Clothing Props



## Appendix D

## Test of Emotion Comprehension (TEC) script

TEST OF EMOTION COMPREHENSION (TEC)  
PROCEDURE**Preliminary remarks**

- The tone of story presentation should be emotionally neutral.
- Always report on-line the child's answer in the score sheet. If the child gives more than one answer note their order.
- Never ask the child to justify his/her answer (only at the end if necessary)
- Component I: If the child fails to produce a response then the examiner points to each picture in turn (left to right, top to bottom) and asks, while pointing: *Is this one (target emotion)?*
- Component I: If the child responds positively to two or more of the pictures then the examiner asks, while pointing to the options: *Choose the best one for (target emotion)!*
- Components II to IX: Always point the different characters and objects involved in the story. In the current procedure names have been attributed to the characters (e.g. Tom, Sarah). However, that's optional.
- Components II to IX: Always point and name the four possible answers.
- Components II to IX: If the child just names the answer then the experimenter has to ask him/her to point the answer. The child does not need to name the answer.
- Components II to IX: Always show the possible answers after the presentation of the story.
- Component II to IX: If the child fails to produce a response then the examiner points to each picture in turn (left to right, top to bottom) and asks, while pointing: *Do you think he (she) is...?*
- Component II to IX: If the child responds positively to two or more of the pictures then the examiner asks, while pointing to the options: *Choose the one that you think is best!*

**Introduction**

*Thank you for helping me with my work. I am going to show you some pictures and then ask you some questions. For every question give me the answer that you think is best by pointing to the picture that you choose. If there is something that you don't understand just tell me, okay? (go to page 1)*

**Component I: Recognition (pp. 1-5)**

*Let's look at these four pictures. Can you point to the person who feels:*

- (p.1) *sad?*
- (p.2) *happy?*
- (p.3) *angry?*
- (p.4) *alright?*
- (p.5) *scared?*

**Transition**

*Okay, now we are going to see some stories. I want you to listen to the whole story and then I'll ask you a question. Wait until I've shown you all the pictures before you point to the answer. (go to page 6)*

**Component II: External causes (pp.6-10)**

(p.6) Turtle

*This boy (girl) is looking at his (her) little turtle, which has just died.*

*How is this boy (girl) feeling? Is he (she) happy, sad, angry or alright?*

(p.7) Birthday

*This boy (girl) is getting a birthday present.*

*How is this boy (girl) feeling? Is he (she) happy, sad, alright or scared?*

(p.8) Brother

*This boy (girl) is trying to do a drawing but his (her) little brother (sister) is stopping him (her).*

*How is this boy (girl) feeling? Is he (she) happy, alright, angry or scared?*

(p.9) Bus

*This boy (girl) is standing at the bus stop.*

*How is this boy (girl) feeling? Is he (she) happy, sad, angry or alright?*

(p.10) Monster

*This boy (girl) is being chased by a monster.*

*How is this boy (girl) feeling? Is he (she) happy, alright, angry or scared?*

**Component III: Desires (pp.11-12)**

(p.11) Coca-cola

*This is Tom (Sarah) and this is Peter (Helen). Tom (Sarah) and Peter (Helen) are very thirsty. Tom (Sarah) likes Coca-Cola very much and Peter (Helen) hates Coca-Cola.*

Control question

*Does Tom (Sarah) like Coca Cola?*

*Does Peter (Helen) like Coca-Cola?*

Positive feedback: *That's right, Tom (Sarah) likes Coca-Cola / That's right, Peter (Helen) doesn't like Coca-Cola.*

Negative feedback: *Well actually, Tom (Sarah) likes Coca-Cola (help) / Well actually, Peter (Helen) doesn't like Coca-Cola. (help)*

*Can you open the box for me? There is Coca Cola in the box!*

*How is Tom (Sarah) feeling when he (she) sees Coca Cola? Is he (she) happy, sad, alright or scared?*

*How is Peter (Helen) feeling when he (she) sees Coca Cola? Is he (she) happy, sad, alright or scared?*

(p.12) Salad

*This is Tom (Sarah) and this is Peter (Helen). Tom (Sarah) and Peter (Helen) are very hungry. Tom (Sarah) hates lettuce and Peter (Helen) likes lettuce very much.*

Control question

*Does Tom (Sarah) like lettuce?*

*Does Peter (Helen) like lettuce?*

Positive feedback: *That's right, Tom (Sarah) doesn't like lettuce / That's right, Peter (Helen) likes lettuce.*

Negative feedback: *Well actually, Tom (Sarah) doesn't like lettuce (help) / Well actually, Peter (Helen) likes lettuce. (help)*

*Can you open the box for me? There is lettuce in the box!*

*How is Tom (Sarah) feeling when he (she) sees lettuce? Is he (she) happy, sad, alright or scared?*

*How is Peter (Helen) feeling when he (she) sees lettuce? Is he (she) happy, sad, alright or scared?*



**Component IV: Beliefs (p.13)**

(p.13) *This is Tom's (Sarah's) rabbit. It is eating a carrot. It likes carrots very much. Can you look behind the bushes? It's a fox. The fox is hiding behind the bushes because he wants to eat the rabbit. Can you put the bushes back on so that the rabbit can't see that the fox is hiding behind the bushes?*

Control question

*Does the rabbit know the fox is hiding behind the bushes?*

Positive feedback: *That's right, the rabbit doesn't know the fox is hiding behind the bushes*

Negative feedback: *Well actually, the rabbit doesn't know the fox is hiding behind in the bushes ("help")*

*How is the rabbit feeling? Is it happy, alright, angry or scared?*

**Component V: Reminders (pp.14-17)**

(p.14) *Tom (Sarah) is very sad because the fox ate his rabbit...*

(p.15) *... Later on that night Tom (Sarah) goes to bed. The next day...*

Control question

(p.16) *...Tom (Sarah) is looking at his (her) photo album. He (She) is looking at a picture of his (her) best friend.*

*How is Tom (Sarah) feeling when he (she) is looking at the picture of his (her) best friend? Is he (she) happy, sad, alright or scared?*

Positive feedback: *That's right, Tom (Sarah) is felling happy when he (she) is looking at the picture of his (her) best friend!*

Negative feedback: *Well actually, Tom (Sarah) is felling happy when he (she) is looking at the picture of his (her) best friend! (help)*

(p.17) *...and now Tom (Sarah) is looking at a picture of his (her) rabbit.*

*How is Tom (Sarah) feeling when he (she) is looking at the picture of his (her) rabbit ? Is he (she) happy, sad, alright or scared?*

**Component VI: Regulations (p.18)**

(p.18) *Tom (Sarah) is looking at a picture of his (her) rabbit. Tom (Sarah) is very sad because his (her) rabbit was eaten by the fox.*

*What is the best way for Tom (Sarah) to stop himself (herself) being sad?*

- *Can Tom (Sarah) cover his (her) eyes to stop himself (herself) being sad!*
- *Can Tom (Sarah) go outside to stop himself (herself) being sad!*
- *Can Tom (Sarah) think about something else to stop himself (herself) being sad!*
- *Is there nothing Tom (Sarah) can do to stop himself (herself) being sad!*

Option (if the child says that Tom (Sarah) may buy a new Rabbit)

*Yes, he (she) can get a new rabbit but Tom (Sarah) is very sad about losing his (her) rabbit. He (She) liked his (her) rabbit very much. What is the best way for Tom (Sarah) to stop himself (herself) being sad about his (her) rabbit?*

**Component VII: Appearance & Reality (p.19)**

(p.19) *This is Tom (Sarah) and this is Daniel (Dorothy). Daniel (Dorothy) is teasing Tom (Sarah) because Daniel (Dorothy) has lots of marbles and Tom (Sarah) doesn't have any. Tom (Sarah) is smiling because he (she) doesn't want to show Daniel (Dorothy) how he (she) is feeling inside.*

*How is Tom (Sarah) feeling inside? Is he (she) happy, alright, angry or scared?*

**Component VIII: Mixed (p.20)**

(p.20) *Tom (Sarah) is looking at the new bicycle that he (she) just got for his (her) birthday. But at the same time, Tom (Sarah) thinks he (she) might fall off and hurt himself (herself) because he (she) has never ridden a bicycle before.*

*So, how is Tom (Sarah) feeling? Is he (she) happy, sad and scared, happy and scared or scared?*

## Component IX: Morality (pp.21-23)

(p.21) *Tom (Sarah) is visiting his (her) friend Peter (Helen). Tom (Sarah) is waiting on his (her) own in the kitchen. Tom (Sarah) sees a jar with some chocolate biscuits in it. He (She) really wants to eat a chocolate biscuit. He (She) loves them.*

Control question

*Is it alright for Tom (Sarah) to eat a chocolate biscuit straight away or should he (she) wait to ask Peter's (Helen's) mummy?*

Positive feedback: *That's right, he (she) should wait because it's naughty to take something without asking.*

Negative feedback: *Well actually, he (she) should wait because it's naughty to take something without asking (help).*

*Tom (Sarah) touches the lid of the jar but he (she) manages to stop himself (herself) from opening it. He (She) doesn't eat a chocolate biscuit because he (she) hasn't asked yet.*

*How does Tom (Sarah) feel when he (she) stops himself (herself)?*

*- Does he (she) feel happy because he (she) stopped himself (herself)?*

*- Does he (she) feel sad because he (she) stopped himself (herself)?*

*- Does he (she) feel angry because he (she) stopped himself (herself)?*

*- Does he (she) feel just alright because he (she) stopped himself (herself)?*

(p.22) *After a little while Tom (Sarah) can't stop himself (herself) from eating a chocolate biscuit.*

(p.23) *Later, Tom (Sarah) goes home. Tom (Sarah) remembers that he (she) ate a chocolate biscuit without asking. He (She) wonders if he (she) should tell his (her) mummy about it. In the end he (she) never tells her about taking the chocolate biscuit.*

*How does Tom (Sarah) feel about that?*

*- Does he (she) feel happy about not telling his (her) mummy?*

*- Does he (she) feel sad about not telling his (her) mummy?*

*- Does he (she) feel angry about not telling his (her) mummy?*

*- Does he (she) feel alright about not telling his (her) mummy?*

## Appendix E

## Event Script

Hello [name of child] come on in. Today we're going to visit the zoo! The zookeeper has been very busy so wants some help with some of the animals. First let's dress you up like the zookeeper. To look like a zookeeper, you need to put on a green hat. The zookeeper needs a tag so that everyone knows who he/she is. I'll put this tag on, that says zookeeper. Awesome, now you really look like a zookeeper! Let's go meet all the animals.

The first animal we will meet is the Cheetah. The Cheetah is happy because she has been playing with friends. You can see that she is happy because she has a big smile! She has been playing hide and seek, and her friend is still hiding! See if you can find her. Well done, you found her friend! Now you should give Cheetah a nice pat. Thank you. Now let's say goodbye to the Cheetah. Goodbye.

Now, we are going to meet the Hippo! The Hippo is scared because there was a loud noise. You can see he is scared because his fur is standing up. You should give him a hug so he feels better. Hippo is not so scared when he has his blanket with him, can you put it over him. Good work, that's better. Thank you. Now let's say goodbye to the Hippo. Goodbye.

The next animal is the Lamb. The Lamb has a warm coat because she usually lives outside. You can see she is warm because she has such thick fur. Can you stroke the Lamb's thick fur? Good work. Because she usually lives in the cold she is too warm being inside. She normally wears this hat; can you take it off so she'll cool down? Nice. Now say goodbye to the Lamb. Goodbye.

The next animal we will meet is the Elephant. The Elephant is happy because it's his birthday today! You can see he is happy because he is jumping around dancing. We have a birthday present for the Elephant, can you give this present to him? Excellent, now we can sing him happy birthday. (Happy Birthday to you, Happy Birthday to you, Happy Birthday dear Elephant, Happy Birthday to you). Good, very nice singing! Now let's say goodbye to the Elephant. Goodbye.

Now we are going to meet the Mouse. The Mouse is scared because her mother is not at home. You can see she is scared because she is crying. Here are some pencils; can you draw a picture of something nice for the Mouse? Wow that's a great picture, now give it to her and she'll be less scared. Well done! Thank you for giving her that nice picture. Now let's say goodbye to the Mouse. Goodbye.

The last animal is the Crocodile. The crocodile can see well in the dark because he is awake at night. You can see that he sees well at night because he has big eyes. He rests during the day, and needs us to do the special sleep dance so he can sleep! Can you dance with me? Like this. Good work! Now give him Teddy to cuddle while he's falling asleep. Thanks. Let's say goodbye to the Crocodile. Goodbye.

Thank you for all your help with the new animals you met! You did such a great job. Now my friend will take you back to your classroom.

Appendix F  
Interview Protocol

NOTE: Each question should be followed by a 10 second pause for child to respond.

Stage I. (Introduction)

**“Hello, my name is \_\_\_\_\_, and I am here today to talk to you about last week when you helped out at the zoo.”**

**“You can see that I have a tape recorder here. It will help me remember everything you tell me today.”**

**“If I ask a question that you don’t know the answer to, you can just say ‘I don’t know’. So, if I ask you the name of my cat, what would you say?”**

[wait for response]

**“That’s right, because you don’t know my cat’s name. But if I ask you the name of your teacher, you would say?”**

[wait for response]

**“That’s right...because you do know your teacher’s name.”**

**“If I ask a question, and you don’t know what I mean, just tell me and I’ll say it again so you do know what I mean.”.**

Stage II. (Rapport Building)

**“First I’d really like you to tell me about something fun you did in the last few days. Just think about something that was really fun (pause). Now tell me everything you did, from the beginning to the very end.”**

**(if child mentions zoo event, say): “Something apart from visiting the zoo”**

**If the child gives a short answer, or gets stuck, ask:**

**“I really want to hear about X, what else can you tell me about that fun time?”**

[wait for a response].

If the child does not answer, say:

**“What was something you enjoyed doing/made you feel happy?”**

[wait for a response]

If child still does not respond, say:

**“like when you went on a school trip/to a birthday party”**

[wait for a response]

When the child has stopped, use cued invitations:

**“you said you did X. Tell me more about that:...”uh huh”, “wow”**

Again, when the child has stopped, further cued invitations:

**“You said you did Y. Tell me more about that” “OK, and then what happened?”**

*(Introduce around 5 cued invitations if possible so the child learns, during this phase, that they are to provide the information)*

**“You’ve done really well telling me lots and lots of things”**

### Stage III (Interview about event)

**“Now, I’d like to talk to you about the day you visited some animals here at school. I wasn’t in the room and I’d really like you to tell me what happened. Tell me everything you can remember that, from beginning to end.”**

[wait for a response]

If child responds:

Non directive prompts: **“uh huh”, “hmmm”, repetition of child’s own words**

**“Tell me more about that”**

**“What else can you remember about that?”**

**“And then what happened?”**

Praise attempts to answer rather than correct answers (**“you’re doing really well; trying really hard”**)

Follow up child’s comments with cued invitations after probing generally for information.

**“You told me you...(e.g. saw a Wokwok), respond “Tell me more about that” “uhuh” etc.**

When memory is apparently exhausted:

### Stage IV (Prompted Questions)

**“I heard you visited a Crocodile at the Zoo. Tell me all about that”**

**“I also heard you visited a Mouse. Tell me about that”**

**“And I heard you visited a Cheetah! Tell me about that”**

**”I also heard you visited an Elephant. Tell me about that”.**

**“I also heard you visited a Lamb. Tell me about that”**

**“I also heard you visited a Hippo. Tell me about that”**

Encourage and follow up responses as above.



## Appendix G

## Coding System

**Free Recall**Opening Sequence

<b>Dress Information (DI) 1</b>	<b>Dress descriptions (DD) - 2</b>	<b>Rational information (RI) -3</b>
<ul style="list-style-type: none"> <li>• (zookeeper) hat,</li> <li>• (zookeeper) Badge/tag</li> </ul>	<ul style="list-style-type: none"> <li>• Green/camouflage hat</li> <li>• badge says zookeeper/had zookeeper written on it,</li> <li>• dress</li> <li>• as/like zookeeper</li> </ul>	<ul style="list-style-type: none"> <li>• Zookeeper very busy, needs help (with animals),</li> <li>• Have to look like a zookeeper</li> <li>• Be a zookeeper</li> </ul>
<ul style="list-style-type: none"> <li>• 2 points</li> </ul>	<ul style="list-style-type: none"> <li>• 4 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>

Hippo

Animal (NA) 4	Emotion (NE) 5	Emotion Expression (NEE) 6	Cause (NC) 7	Emotion-Cause Link (NL) 8	Activities (NCA) 9	Descriptions (ND) 10	Place (NP) 11	Non-core activity (NN) 12
<ul style="list-style-type: none"> <li>• Hippo</li> </ul>	<ul style="list-style-type: none"> <li>• Scared/afraid, got a fright</li> </ul>	<ul style="list-style-type: none"> <li>• Fur/hair standing up,</li> <li>• eyebrows/eyes pointed down/ wobbly mouth</li> </ul>	<ul style="list-style-type: none"> <li>• There was a loud noise/ heard a big bang/there were noises</li> </ul>	<ul style="list-style-type: none"> <li>• Because, as e.g. “scared cos there was loud noise” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Put over/on/ around, gave</li> <li>• blanket</li> <li>• give</li> <li>• a hug/ cuddle, hugged</li> <li>• <u>Rational</u>: not so scared/ won’t be scared, feel better, cheer him up</li> </ul>	<ul style="list-style-type: none"> <li>• Fluffy,</li> <li>• pink,</li> <li>• soft,</li> </ul>	<ul style="list-style-type: none"> <li>• Describes placement (e.g. On a chair /between table and heater /pointing to place)</li> </ul>	<ul style="list-style-type: none"> <li>• Saying goodbye</li> <li>• Waved</li> </ul>
<ul style="list-style-type: none"> <li>• 1 pt</li> </ul>	<ul style="list-style-type: none"> <li>• 1 pt</li> </ul>	<ul style="list-style-type: none"> <li>• 2 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 5 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 2 point</li> </ul>
<ul style="list-style-type: none"> <li>• D 13</li> </ul>	<ul style="list-style-type: none"> <li>• MM sad, angry, upset, nervous, lonely 14</li> </ul>	<ul style="list-style-type: none"> <li>• D spikey fur, funny mouth 15</li> </ul>	<ul style="list-style-type: none"> <li>• D got a fright, someone surprised him 16</li> </ul>		<ul style="list-style-type: none"> <li>• D throw, hurl</li> <li>• Squeeze him</li> <li>• Make happy/ felt happier</li> <li>• Warm him up</li> </ul>	<ul style="list-style-type: none"> <li>• D wrong colour, texture, size. Descriptions can’t be credited to another animal. 19</li> </ul>	<ul style="list-style-type: none"> <li>• D different place to actual place 20</li> </ul>	<ul style="list-style-type: none"> <li>• D 21</li> </ul>

Cheetah

Animal (PA) 24	Emotion (PE) 25	Emotion Expression (PEE) 26	Cause (PC) 27	Emotion-Cause Link (PL) 28	Activities (PCA) 29	Descriptions (PD) 30	Place (PP) 31	Non-core activity (PN) 32
<ul style="list-style-type: none"> <li>Cheetah,</li> </ul>	<ul style="list-style-type: none"> <li>happy</li> </ul>	<ul style="list-style-type: none"> <li>Smiling/ big smile,</li> </ul>	<ul style="list-style-type: none"> <li>Playing, playing hide &amp; seek, playing a game, with friends,</li> </ul>	<ul style="list-style-type: none"> <li>Because/as e.g. “happy cos been playing with friends” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>Find/search/ looked for/got</li> <li>her friend/duck,</li> <li>pat/stroke</li> <li>give (pat).</li> <li><u>Rational:</u> friend still hiding, cant find friend</li> </ul>	<ul style="list-style-type: none"> <li>Had spots,</li> <li>Blue/brown (spots)</li> <li>orange/ yellow (body)</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On the table, /in that corner /pointing to right place)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>5 points</li> </ul>	<ul style="list-style-type: none"> <li>3 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D leopard, jaguar, tiger <b>33</b></li> </ul>	<ul style="list-style-type: none"> <li>MM excited, glad, cheerful <b>34</b></li> </ul>	<ul style="list-style-type: none"> <li>D laughing <b>35</b></li> </ul>	<ul style="list-style-type: none"> <li>D chasing, tag, <b>36</b></li> </ul>		<ul style="list-style-type: none"> <li>D lost (her friends)</li> <li>hiding from friends</li> <li>duck finding cheetah</li> <li>looking for the cheetah <b>37</b></li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can’t be credited to another animal. <b>38</b></li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place <b>39</b></li> </ul>	<ul style="list-style-type: none"> <li>D <b>40</b></li> </ul>

Lamb

Animal (AA) 43	Emotion (AE) 44	Emotion Expression (AEE) 45	Cause (AC) 46	Emotion-Cause Link (AL) 47	Activities (ACA) 48	Descriptions (AD) 49	Place (AP) 50	Non-core activity (AN) 51
<ul style="list-style-type: none"> <li>Lamb</li> </ul>	<ul style="list-style-type: none"> <li>Has warm coat, has coat / is warm</li> </ul>	<ul style="list-style-type: none"> <li>Thick/woolly</li> <li>fur</li> </ul>	<ul style="list-style-type: none"> <li>Usually lives/ stays outside,</li> <li>Lives/ stays in the cold,</li> </ul>	<ul style="list-style-type: none"> <li>Because, as e.g. “warm coat cos she usually lives outside” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>Stroke/pat/ touched (fur/it)</li> <li>take off</li> <li>hat/wool/hood,</li> <li><u>Rational</u> cool down, too hot/warm being inside</li> </ul>	<ul style="list-style-type: none"> <li>Orange/ brown/white</li> <li>jumper/ hoody/jacket</li> <li>fluffy/furry</li> </ul>	Describes placement (e.g., On chair, /by the heater /points right direction)	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>4 point</li> </ul>	<ul style="list-style-type: none"> <li>3 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D 52</li> </ul>	<ul style="list-style-type: none"> <li>MM see well in dark, cold 53</li> </ul>	<ul style="list-style-type: none"> <li>D e.g., 54</li> </ul>	<ul style="list-style-type: none"> <li>D in snow, mountains, farm, paddock 55</li> </ul>		<ul style="list-style-type: none"> <li>D 56 better, happy again</li> <li>Ripped, yanked</li> <li>Tickled</li> <li>Hit</li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can’t be credited to another animal. 57</li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place 58</li> </ul>	<ul style="list-style-type: none"> <li>D</li> </ul>

Elephant

Animal (AP) 62	Emotion (PE) 63	Emotion Expression (PEE) 64	Cause (PC) 65	Emotion-Cause Link (PL) 66	Activities (PCA) 67	Descriptions (PD) 68	Place (PP) 69	Non-core activity (PN) 70
<ul style="list-style-type: none"> <li>Elephant, heffalump, lumpy</li> </ul>	<ul style="list-style-type: none"> <li>Happy</li> </ul>	<ul style="list-style-type: none"> <li>Jumping</li> <li>dancing,</li> </ul>	<ul style="list-style-type: none"> <li>Birthday today</li> </ul>	<ul style="list-style-type: none"> <li>Because, as e.g. "happy cos its his birthday "</li> </ul> <p><i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></p>	<ul style="list-style-type: none"> <li>There was/give</li> <li>a present/gift</li> <li>sing/sang</li> <li>song/happy birthday</li> <li><u>Rational:</u> we have a present for him</li> </ul>	<ul style="list-style-type: none"> <li>Purple,</li> <li>trunk,</li> <li>hair sticking up</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On chair, /Point to right direction)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>5 points</li> </ul>	<ul style="list-style-type: none"> <li>3 points</li> </ul>	<ul style="list-style-type: none"> <li>1 points</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D 71</li> </ul>	<ul style="list-style-type: none"> <li>MM excited, cheerful, glad 72</li> </ul>	<ul style="list-style-type: none"> <li>D 73</li> </ul>	<ul style="list-style-type: none"> <li>D she was getting presents, 74</li> </ul>		<ul style="list-style-type: none"> <li>D said happy birthday</li> <li>Bought</li> <li>Toy, teddy 75</li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions not credited another animal. 76</li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place 77</li> </ul>	<ul style="list-style-type: none"> <li>D 78</li> </ul>

Mouse

Animal (NA) 81	Emotion (NE) 82	Emotion Expression (NEE) 83	Cause (NC) 84	Emotion-Cause Link (NL) 85	Activities (NCA) 86	Descriptions (ND) 87	Place (NP) 88	Non-core activity (NN) 89
<ul style="list-style-type: none"> <li>• Mouse, rat</li> </ul>	<ul style="list-style-type: none"> <li>• Scared, afraid,</li> </ul>	<ul style="list-style-type: none"> <li>• Crying, tears,</li> </ul>	<ul style="list-style-type: none"> <li>• Mother/parents</li> <li>• gone/out / away,</li> </ul>	<ul style="list-style-type: none"> <li>• Because, as e.g. “scared cos mother is out”(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</li> </ul>	<ul style="list-style-type: none"> <li>• Drew/made</li> <li>• give</li> <li>• picture/drawing/card</li> <li>• <u>Rational</u>: not so scared, feel better</li> <li>• what they drew</li> </ul>	<ul style="list-style-type: none"> <li>• Grey,</li> <li>• wearing a t shirt,</li> <li>• crayons</li> </ul>	Describes placement (e.g., On table /in corner /point in right direction)	<ul style="list-style-type: none"> <li>• Saying goodbye</li> <li>• Waved</li> </ul>
<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 2 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 5 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 points</li> </ul>	<ul style="list-style-type: none"> <li>• 2 point</li> </ul>
<ul style="list-style-type: none"> <li>• D 90</li> </ul>	<ul style="list-style-type: none"> <li>• MM e.g., sad, angry, nervous, anxious, upset 91</li> </ul>	<ul style="list-style-type: none"> <li>• D 92</li> </ul>	<ul style="list-style-type: none"> <li>• D e.g., got left by himself, 93</li> </ul>		<ul style="list-style-type: none"> <li>• D 94 distortion of rationale e.g., happy</li> </ul>	<ul style="list-style-type: none"> <li>• D wrong colour, texture, size. Descriptions can't be credited to another animal. 95</li> </ul>	<ul style="list-style-type: none"> <li>• D anywhere in the wrong place 96</li> </ul>	<ul style="list-style-type: none"> <li>• D 97</li> </ul>

Crocodile

Animal (AA) 100	Emotion (AE) 101	Emotion Expression (AEE) 102	Cause (AC) 103	Emotion-Cause Link (AL) 104	Activities (ACA) 105	Descriptions (AD) 106	Place (AP) 107	Non-core activity (AN) 108
<ul style="list-style-type: none"> <li>• Crocodile</li> </ul>	<ul style="list-style-type: none"> <li>• See well /good in the dark/ night,</li> </ul>	<ul style="list-style-type: none"> <li>• Big eyes</li> </ul>	<ul style="list-style-type: none"> <li>• Awake at night,</li> </ul>	<ul style="list-style-type: none"> <li>• Because, as e.g. “can see well in the dark because he is awake at night” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Do (sleep) dance,</li> <li>• Go to sleep</li> <li>• give</li> <li>• teddy/mouse</li> <li>• <u>Rational</u> sleep dance so he can sleep,</li> <li>• to cuddle (teddy) while falling asleep, going to bed</li> </ul>	<ul style="list-style-type: none"> <li>• Yellow eyes,</li> <li>• (sharp/big/ white) teeth,</li> <li>• colour</li> </ul>	<ul style="list-style-type: none"> <li>• Describes placement (e.g., On shelf, /by the door /points right direction)</li> </ul>	<ul style="list-style-type: none"> <li>• Saying goodbye</li> <li>• Waved</li> </ul>
<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1point s</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 6 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 points</li> </ul>	<ul style="list-style-type: none"> <li>• 2 point</li> </ul>
<ul style="list-style-type: none"> <li>• D 109</li> </ul>	<ul style="list-style-type: none"> <li>• MM e.g., warm 110</li> </ul>	<ul style="list-style-type: none"> <li>• D huge, massive, gigantic 111</li> </ul>	<ul style="list-style-type: none"> <li>• D active, midnight, night animals 112</li> </ul>		<ul style="list-style-type: none"> <li>• D 113</li> </ul>	<ul style="list-style-type: none"> <li>• D wrong colour, texture, size. Descriptions can’t be credited to another animal. 114</li> </ul>	<ul style="list-style-type: none"> <li>• D anywhere in the wrong place 115</li> </ul>	<ul style="list-style-type: none"> <li>• D 116</li> </ul>

**Prompted Recall**Hippo

Animal (NA) 119	Emotion (NE) 120	Emotion Expression (NEE) 121	Cause (NC) 122	Emotion-Cause Link (NL) 123	Activities (NCA) 124	Descriptions (ND) 125	Place (NP) 126	Non-core activity (NN) 127
<ul style="list-style-type: none"> <li>Hippo</li> </ul>	<ul style="list-style-type: none"> <li>Scared/afraid, got a fright</li> </ul>	<ul style="list-style-type: none"> <li>Fur/hair standing up,</li> <li>eyebrows/eyes pointed down /wobbly mouth</li> </ul>	<ul style="list-style-type: none"> <li>There was a loud noise/heard a big bang/there were noises</li> </ul>	<ul style="list-style-type: none"> <li>Because, as e.g. “scared cos there was loud noise” (<i>Must have 1 emotion &amp; 1 cause, 1 of which is correct</i>)</li> </ul>	<ul style="list-style-type: none"> <li>Put over/on/around, gave</li> <li>blanket</li> <li>give</li> <li>hug/cuddle, hugged</li> <li><u>Rational</u>: not so scared/won’t be scared, feel better, cheer him up</li> </ul>	<ul style="list-style-type: none"> <li>Fluffy,</li> <li>pink,</li> <li>soft,</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On a chair, /between table and heater /pointing to place)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 pt</li> </ul>	<ul style="list-style-type: none"> <li>1 pt</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>5 points</li> </ul>	<ul style="list-style-type: none"> <li>3 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D 128</li> </ul>	<ul style="list-style-type: none"> <li>MM sad, angry, upset, nervous, lonely 129</li> </ul>	<ul style="list-style-type: none"> <li>D spikey fur, funny mouth 130</li> </ul>	<ul style="list-style-type: none"> <li>D got a fright, someone surprised him 131</li> </ul>		<ul style="list-style-type: none"> <li>D throw, hurl</li> <li>squeezed him</li> <li>Make him happy/felt happier</li> <li>Warm him up 132</li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can’t be credited to another animal. 133</li> </ul>	<ul style="list-style-type: none"> <li>D different place to actual place 134</li> </ul>	<ul style="list-style-type: none"> <li>D 135</li> </ul>



Cheetah

Animal (PA) 138	Emotion (PE) 139	Emotion Expression (PEE) 140	Cause (PC) 141	Emotion-Cause Link (PL) 142	Activities (PCA) 143	Descriptions (PD) 145	Place (PP) 146	Non-core activity (PN) 147
<ul style="list-style-type: none"> <li>Cheetah , leopard , jaguar</li> </ul>	<ul style="list-style-type: none"> <li>happy</li> </ul>	<ul style="list-style-type: none"> <li>Smiling/big smile,</li> </ul>	<ul style="list-style-type: none"> <li>Playing, playing hide &amp; seek, playing a game,</li> <li>with friends,</li> </ul>	<ul style="list-style-type: none"> <li>Because/as e.g. “happy cos been playing with friends” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>Find/search/looked for/got</li> <li>her friend/duck,</li> <li>Pat/stroke</li> <li>Give (pat)</li> <li><u>Rational:</u> friend still hiding, cant find friend</li> </ul>	<ul style="list-style-type: none"> <li>Had spots,</li> <li>Blue/brown (spots)</li> <li>orange/yellow (body)</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On the table, /in that corner /pointing to right place)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>5 points</li> </ul>	<ul style="list-style-type: none"> <li>3 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D leopard , jaguar, tiger <b>148</b></li> </ul>	<ul style="list-style-type: none"> <li>MM excited, glad, cheerful <b>149</b></li> </ul>	<ul style="list-style-type: none"> <li>D laughing <b>150</b></li> </ul>	<ul style="list-style-type: none"> <li>D chasing, tag, <b>151</b></li> </ul>		<ul style="list-style-type: none"> <li>D lost (her friends)</li> <li>hiding from friends</li> <li>duck finding cheetah</li> <li>looking for the cheetah</li> <li>hugged, <b>152</b></li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can’t be credited to another animal. <b>153</b></li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place <b>154</b></li> </ul>	<ul style="list-style-type: none"> <li>D <b>155</b></li> </ul>

Lamb

Animal (AA) 158	Emotion (AE) 159	Emotion Expression (AEE) 160	Cause (AC) 161	Emotion-Cause Link (AL) 162	Activities (ACA) 163	Descriptions (AD) 164	Place (AP) 165	Non-core activity (AN) 166
<ul style="list-style-type: none"> <li>Lamb</li> </ul>	<ul style="list-style-type: none"> <li>Has warm coat, has coat/is warm</li> </ul>	<ul style="list-style-type: none"> <li>Thick/woolly</li> <li>fur</li> </ul>	<ul style="list-style-type: none"> <li>Usually lives/stays outside,</li> <li>Lives/stays in the cold,</li> </ul>	<ul style="list-style-type: none"> <li>Because, as e.g. “warm coat cos she usually lives outside” (<i>Must have 1 emotion &amp; 1 cause, 1 of which is correct</i>)</li> </ul>	<ul style="list-style-type: none"> <li>Stroke/pat/touched (fur/it)</li> <li>Take off hat/wool/hood</li> <li><u>Rational</u> cool down, too hot/warm being inside</li> </ul>	<ul style="list-style-type: none"> <li>Orange/brown/white</li> <li>jumper/hood y/jacket</li> <li>fluffy/furry</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On chair, /by the heater /points right direction)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>4 point</li> </ul>	<ul style="list-style-type: none"> <li>3 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D 167</li> </ul>	<ul style="list-style-type: none"> <li>MM see well in the dark, cold 168</li> </ul>	<ul style="list-style-type: none"> <li>D 169</li> </ul>	<ul style="list-style-type: none"> <li>D in snow, mountains, farm, paddock 170</li> </ul>		<ul style="list-style-type: none"> <li>D 171 better, happy again</li> <li>Ripped, yanked</li> <li>Tickled</li> <li>Hit</li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can't be credited to another animal. 172</li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place 173</li> </ul>	<ul style="list-style-type: none"> <li>D 174</li> </ul>

Elephant

Animal (AP) 177	Emotion (PE) 178	Emotion Expression (PEE) 179	Cause (PC) 180	Emotion-Cause Link (PL) 181	Activities (PCA) 182	Descriptions (PD) 183	Place (PP) 184	Non-core activity (PN) 185
<ul style="list-style-type: none"> <li>Elephant, heffalump, lumpy</li> </ul>	<ul style="list-style-type: none"> <li>Happy</li> </ul>	<ul style="list-style-type: none"> <li>Jumping,</li> <li>dancing,</li> </ul>	<ul style="list-style-type: none"> <li>Birthday today</li> </ul>	<ul style="list-style-type: none"> <li>Because, as e.g. “happy cos its his birthday”( <i>Must have 1 emotion &amp; 1 cause, 1 of which is correct</i>)</li> </ul>	<ul style="list-style-type: none"> <li>There was/give</li> <li>a present,</li> <li>sing/sang</li> <li>song/happy birthday</li> <li><u>Rational:</u> we have a present for him</li> </ul>	<ul style="list-style-type: none"> <li>Purple,</li> <li>trunk,</li> <li>hair sticking up</li> </ul>	<ul style="list-style-type: none"> <li>Describes placement (e.g., On chair, /Point to right direction)</li> </ul>	<ul style="list-style-type: none"> <li>Saying goodbye</li> <li>Waved</li> </ul>
<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>2 points</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>1 point</li> </ul>	<ul style="list-style-type: none"> <li>5 points</li> </ul>	<ul style="list-style-type: none"> <li>3 points</li> </ul>	<ul style="list-style-type: none"> <li>1 points</li> </ul>	<ul style="list-style-type: none"> <li>2 point</li> </ul>
<ul style="list-style-type: none"> <li>D 186</li> </ul>	MM excited, cheerful, glad 187	<ul style="list-style-type: none"> <li>D 188</li> </ul>	<ul style="list-style-type: none"> <li>D she was getting presents 189</li> </ul>		<ul style="list-style-type: none"> <li>D said happy birthday</li> <li>Bought</li> <li>Toy, teddy 190</li> </ul>	<ul style="list-style-type: none"> <li>D wrong colour, texture, size. Descriptions can’t be credited to another animal. 191</li> </ul>	<ul style="list-style-type: none"> <li>D anywhere in the wrong place 192</li> </ul>	<ul style="list-style-type: none"> <li>D 193</li> </ul>

Mouse

Animal (NA) 196	Emotion (NE) 197	Emotion Expression (NEE) 198	Cause (NC) 199	Emotion-Cause Link (NL) 200	Activities (NCA) 201	Descriptions (ND) 202	Place (NP) 203	Non-core activity (NN) 204
<ul style="list-style-type: none"> <li>• Mouse, rat</li> </ul>	<ul style="list-style-type: none"> <li>• Scared, afraid,</li> </ul>	<ul style="list-style-type: none"> <li>• Crying, tears,</li> </ul>	<ul style="list-style-type: none"> <li>• Mother/parents</li> <li>• gone/out/away,</li> </ul>	<ul style="list-style-type: none"> <li>• Because, as e.g. “scared cos mother is out”(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</li> </ul>	<ul style="list-style-type: none"> <li>• Drew/made</li> <li>• give</li> <li>• picture/drawing/card</li> <li>• <u>Rational</u>: not so scared,</li> <li>• what they drew</li> </ul>	<ul style="list-style-type: none"> <li>• Grey,</li> <li>• wearing a t shirt,</li> <li>• crayons</li> </ul>	<ul style="list-style-type: none"> <li>• Describes placement (e.g., On table /in corner /point in right direction)</li> </ul>	<ul style="list-style-type: none"> <li>• Saying goodbye</li> <li>• waved</li> </ul>
<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 2 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 5 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 2 point</li> </ul>
<ul style="list-style-type: none"> <li>• D 205</li> </ul>	<ul style="list-style-type: none"> <li>• MM sad, angry, nervous, anxious, upset206</li> </ul>	<ul style="list-style-type: none"> <li>• D 207</li> </ul>	<ul style="list-style-type: none"> <li>• D got left by himself 208</li> </ul>		<ul style="list-style-type: none"> <li>• D 209 distortion of rationale e.g., happy</li> </ul>	<ul style="list-style-type: none"> <li>• D wrong colour, texture, size. Descriptions can't be credited to another animal. 210</li> </ul>	<ul style="list-style-type: none"> <li>• D anywhere in the wrong place 211</li> </ul>	<ul style="list-style-type: none"> <li>• D 212</li> </ul>

Crocodile

Animal (AA) 215	Emotion (AE) 216	Emotion Expression (AEE) 217	Cause (AC) 218	Emotion-Cause Link (AL) 219	Activities (ACA) 220	Descriptions (AD) 221	Place (AP) 222	Non-core activity (AN) 223
<ul style="list-style-type: none"> <li>• Crocodile</li> </ul>	<ul style="list-style-type: none"> <li>• See well /good in the dark/ night</li> </ul>	<ul style="list-style-type: none"> <li>• Big eyes</li> </ul>	<ul style="list-style-type: none"> <li>• Awake at night,</li> </ul>	<ul style="list-style-type: none"> <li>• Because, as e.g. “can see well in the dark because he is awake at night” <i>(Must have 1 emotion &amp; 1 cause, 1 of which is correct)</i></li> </ul>	<ul style="list-style-type: none"> <li>• Do (sleep) dance,</li> <li>• Go to sleep</li> <li>• give</li> <li>• teddy/mouse</li> <li>• <u>Rational</u> sleep dance so he can sleep,</li> <li>• to cuddle (teddy) while falling asleep, going to bed</li> </ul>	<ul style="list-style-type: none"> <li>• Yellow eyes,</li> <li>• (sharp/big/ white) teeth,</li> <li>• colour</li> </ul>	<ul style="list-style-type: none"> <li>• Describes placement (e.g., On shelf, /by the door /points right direction)</li> </ul>	<ul style="list-style-type: none"> <li>• Saying goodbye</li> <li>• Waved</li> </ul>
<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1point s</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 6 points</li> </ul>	<ul style="list-style-type: none"> <li>• 3 points</li> </ul>	<ul style="list-style-type: none"> <li>• 1 point</li> </ul>	<ul style="list-style-type: none"> <li>• 2 point</li> </ul>
<ul style="list-style-type: none"> <li>• D 224</li> </ul>	<ul style="list-style-type: none"> <li>• MM warm 225</li> </ul>	<ul style="list-style-type: none"> <li>• D huge, massive, gigantic 226</li> </ul>	<ul style="list-style-type: none"> <li>• D active, midnight, night animals 227</li> </ul>		<ul style="list-style-type: none"> <li>• D 228</li> </ul>	<ul style="list-style-type: none"> <li>• D wrong colour, texture, size. Descriptions can't be credited to another animal. 229</li> </ul>	<ul style="list-style-type: none"> <li>• D anywhere in the wrong place 230</li> </ul>	<ul style="list-style-type: none"> <li>• D 231</li> </ul>

Coding Notes

- Repeated information is not to be coded. If information is repeated but now allocated to an incorrect animal, ignore repetition but code as 237
- When a child correctly reports something then later distorts it or vice versa, code *both* the distortion and the correct information.
- Do not code correct but irrelevant information such as “the lamb had four legs”.
- Intrusions are in the reporting of animals, emotions, activities etc that were not in the event when the children **clearly** believed that it was in the event. Code each noun and each verb as separate intrusions. Intrusions are not coded in relation to any animal, code as 234. Stop coding after 15 intrusions in a row. Start coding again when the interview orientates the child back to the event.
- Positive emotional intrusion = **235**.
- Negative emotional intrusion = **236**.
- Incorrect connections. Two correct aspects incorrectly related to each other even if previously reported for correct animal e.g., I gave a present to the hippo. Code all correct information and then give code for the incorrect connection. Code for each incorrect connection, for example “I have the lamb a hug, then I gave it a blanket” would be correct information and 2 incorrect connections. Code as **237**.
- Emotions reported with an incorrect or intruded animal can only be linked to the correct animal if there are two pieces of correct information indicating that the child is remembering information of that animal e.g., the hippo was happy because it played with his friends. Code emotions that cannot be related to any animal as **258**.
- “Gave” credits, if reported with a different animal, are allocated with reference to *what* they gave. E.g., “I gave the hippo a drawing” , the gave credit would be allocated to the mouse