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## STUDENT LEARNING, CHILDHOOD & VOICES | RESEARCH ARTICLE

# Reminiscence spike in reading recall between the ages of 8–11: The influence of early memories on attitudes and actions

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**Abstract:** An investigation into the recalled reading of 31 environmental educators has uncovered a potential link between early reading and pro-environmental attitudes. The recalled books are not only from the recognised “reminiscence bump” of adolescence and early adulthood, but there also appears to be a spike in recall of books within the 8–11-year reading age group. This 8–11-year age group, also known as middle childhood is recognised within other disciplines as being an influential or significant time for learning. The discovery of these earlier memories from stories and their ongoing influence highlights the potential of incidental learning and pre-adolescent attitude formation.

**Subjects:** Behavioral Sciences; Education; Literature

**Keywords:** memory; reading; reminiscence bump; attitude formation

### 1. Introduction

A research project was undertaken to examine the potential influence of reading on environmental educators in Australia to ascertain if any genre or story type could potentially encourage future generations to consider more positive environmental responses (Freestone & O'Toole, 2014). This study set out to discover what participants' reading appeared to be influential in their lives and when

### ABOUT THE AUTHORS

The interaction of literacy, environmental education, patterns of recalled literature and the development of values that is integral to this paper is part of a wider investigation into the antecedents of adult commitment and the consequent relative importance of various levels of schooling. The impact of childhood reading on the development of other adult commitments (such as to teaching or scientific research) is the subject of on-going work.

Margaret Freestone [PhD, MPET, M Env Mgt & Rest, B A (Com), PG Cert Enviro Ed] has an enduring and continuing interest in literature and the development of values and this strongly informed the present research and suggests future directions.

J. Mitchell O'Toole [PhD, MEd(Hons), BSc(Ed)] has a continuing interest in literacy issues beyond subject English and this enriches the literature base of on-going work and suggests channelling of future research into educational and scientific directions.

### PUBLIC INTEREST STATEMENT

The wider literature into which this paper fits suggests that childhood reading may be disconnected from adult commitment but the research documented here suggests that earlier reading patterns may be influential in the development of environmental values. Previous studies into memory have indicated that many people's easiest recalled memories follow a “reminiscence bump” at adolescence or early adulthood. However, this study suggested an earlier “memory spike” at 8–11 years. This earlier spike suggests that an individual's values and attitudes may be influenced by what they read at that stage in their lives. This could prove useful for teachers and carers in encouraging incidental learning from children's literature.

this reading occurred. As research into significant memories suggests the reminiscence bump occurs in adolescence and early adulthood (Elnick, Margrett, Fitzgerald, & Labouvie-Vief, 1999; Janssen, Chessa, & Murre, 2007; Janssen, Rubin, & St. Jacques, 2011; Rathbone, Moulin, & Conway, 2008; Rubin, Rahhal, & Poon, 1998) this was the anticipated major recall age group for the study.

Previous research on the reminiscence bump used 10-year “memory bins” as the unit of analysis and later work has reduced these bins to 5-year spans (Janssen et al., 2011). The results of our study allow this span to be further reduced.

Research into the importance of encouraging ongoing education in science, technology, engineering and mathematics (STEM) and the potential methods of promoting this have been widely discussed (DeWitt, Archer, & Osborne, 2013; Venville, Rennie, Hanbury, & Longnecker, 2013). Investigations into the attitudes of students towards STEM in middle school in years 6–8 have been undertaken (Kier, Blanchard, Osborne, & Albert, 2014), as have studies into adult recall of influences that may indicate early pro-scientific interests (Maltese & Tai, 2009). Yet the influence of literature on scientific attitudes appears to be limited to examining the use of current material (Spiegel, McQuillan, Halpin, Matuk, & Diamond, 2013), rather than relating it to individual’s recognition of previous influences.

Previous studies into early pro-environmental influences on active environmentalists have brushed over the influence of reading, reporting a few mentions of scientific books but no reports of fictional reading material (Corcoran, 1999; Hsu, 2009; Palmer, Suggate, Robottom, & Hart, 1999). However, fiction has been shown to influence people, (Eraut, 2000; Graesser, Olde, & Klettke, 2002; Green & Brock, 2000; Hakemulder, 2008; Mar, Djikic, & Oatley, 2008; Oatley, 2002; Prentice & Gerrig, 1999; Slater & Rouner, 2002) and as the learning from fiction is informal; incidental or accidental accumulation of information from these sources may have occurred (Eraut, 2000).

Other literature indicates that patterns exist in people’s recollection and suggests that fictional reading influences the development of participants’ personal values and resultant actions (Bigger & Webb, 2010; Krathwohl, Bloom, & Masia, 1973; Novitz, 1987). These values inform individual’s attitudes and actions so early reading may have been a significant influence in their later life choices. The age of this influence may be important especially if participants recall reading at a specific age. This highlights the importance of the participant’s recall of special books or authors from their formative years. This paper provides a finer grained exploration of the location and function of the suggested reminiscence bump of adolescence to early adulthood (Janssen et al., 2011) than has so far appeared.

## 2. Methodology and method

A Grounded Theory approach was used to examine the data gathered from semi-structured interviews and to discover if any unrecognised influence from informal sources could have influenced the participants in their pro-environmental attitudes and actions. A Grounded Theory design for this study was chosen to ensure that conclusions grew from the data and observations of the interviews, rather than from pre-conceived ideas (Easton, Koro-Ljungberg, & Cheng, 2009; Ezzy, 2002; Schwandt, 2007). Constructivists often use grounded theory as a lens to form impressions and create meaning and theory as the research in the specific situation progresses (Creswell, 2002, 2009; Ezzy, 2002; Mishler, 1990).

A grounded theory was used to propose a plausible relationship between the concepts and is tested using the various methods of categorising the data to produce a conceptually dense theory (Schwandt, 2007).

This study also used a Narrative Analysis Approach (Boje, 2001; Earthy & Cronin, 2008; Riessman, 2008; Sorsoli, 2007) to look within the data for each participant’s individual truth rather than “the” truth of all participants, their individual microstoria (Boje, 2001). Thus interpretation of the data

relies on the filters used to examine the data during the analysis period to reveal the themes rather than on Discourse Analysis (Sorsoli, 2007).

A link between the books the participants remembered from their childhood, their teacher training and the stories the participants told during the interviews, revealed the influence the childhood literature had on them and their way of thinking, as, according to Hart (2003), teachers' stories reflect what they feel is important. Within constructionist research, Narrative Constructivist Inquiry suggests that the stories people tell others may reveal the inner working of the storyteller's mind (Sorsoli, 2007), reflecting personal experiences and inner feelings and emotions. While not denying the importance of the social setting and the influence of others, Sparkles and Smith (2008) quote others in saying

[C]onstructivism sees narratives as making explicit the meaning that is there in experience (Freeman, 1999). It views them as cognate schemas or scripts through which people understand the world (McAdams, 2006, p. 297)

Using a constructivist paradigm as described by Guba and Lincoln (1994) and Creswell (2009) this study, like previous work in the field, relies on the participants' memories of their reading as data. The positive reliability of memory for research has been addressed in various literature, as retelling stories is how individuals reflect what they have learnt over time (Chawla, 1998; Clough, 2002; Kellehear, 1993) and contains a mixture of events and personal facts (Janssen et al., 2007). Further reports highlight that autobiographical memory may not be exactly correct, but rather may reflect the overall gist of the situation (Chawla, 1999; Wagenaar, 1986). These studies have used such memories for previous research and relying on participants' memories in this study was appropriate as the books nominated may reveal previously unidentified influences in encouraging pro-environmentalism.

Research into the influence of narratives also suggests that people easily understand information presented in stories (Green & Brock, 2005) and then rely on their own internal story bank to help quickly assess information provided and make current choices (Mazzocco, Green, & Brock, 2007). Thus, the recall of memorable childhood stories or authors indicates influential material that may—or may not—have been recognised as important by the participants, influencing the formation of their ongoing attitudes, values and life choices. As participants (un)intentionally built on their gained knowledge, the influence of these books may have increased over time (Appel & Richter, 2007).

Qualitative research techniques were chosen for this study because the research question was best addressed by asking searching questions of the participants to better enable them to recall the potentially shadowy memories of their childhood reading matter (Chawla, 1998; Douglas, Roberts, & Thompson, 1988). The semi-structured interview format also released them to choose what areas they wish to discuss and what trains of thought they felt most comfortable in pursuing (Creswell, 2009; Freebody, 2003). In similar qualitative research interviewing teachers about their formative experiences Hart (2003) also chose conversational interviewing as the most appropriate method of collecting data.

This research employs concepts not normally associated with using interviews in qualitative research. Discovering details about individuals' incidental learning has been a challenge for researchers (Mazzocco et al., 2007; Schugurensky, 2006) so the incidental and reactive learning was triangulated rather than deliberately expressed by the participants. Knowledge that is realised after the event is referred to as reactive learning, while knowledge consciously deliberated on and acknowledged at the time it was delivered is deliberate learning. In an attempt to explain incidental learning, previous studies have used direct observation and in-depth interviews (Callanan & Braswell, 2006; Eraut, 2000; Livingstone, 2006; Stadler & Frensch, 1998), however, understanding implicit learning is complex as the specific source of the implicit knowledge is often unrecalled (Livingstone, 2006; Stadler & Frensch, 1998).

This study also combined concepts from unobtrusive data collection (Creswell, 2009; Kellehear, 1993; Lee, 2000; Webb, Campbell, Schwartz, & Sechrest, 2000) to assist in exploring the collected data. The unobtrusive data collection method of measuring erosion and accretion has been used as data to indicate occurrences that may not otherwise be measured. Previous research has used the replacement time of floor tiles as an indication of popularity of a museum exhibit and in another study the amount of reading of a library book was judged by the number of dog-eared pages and fingerprints present (Webb et al., 2000, pp. 37–38). In this research, the accretion of participants mentioning favourite books or authors is used as an indicator of importance to the cohort. The number of times certain books, authors or genres are mentioned was used to identify potentially important texts.

### 2.1. Method

Environmental educators from environmental education centres in Queensland, New South Wales and Tasmania were interviewed between August and October in 2011 and asked to recall their reading. Thirty-one participants participated in semi-structured interviews with an average duration of an hour which were audio recorded and subsequently transcribed by the interviewer within a fortnight of the interviews. Participants were asked in general about their particularly memorable books or authors, however, no verbal cues of books or authors were suggested by the interviewer. Participants were specifically asked to recall their favourite books or authors, which they remembered reading in primary school, high school and also at university. This covers the ages of 10–40 identified as the reminiscence bump in previous studies into memory (Janssen et al., 2011). Participants were aware that the study was looking at reading, however no leading questions were included in the interviews, concerning the kind of reading matter they recalled, or the ages at which they read the books. This lack of cue words represents a difference between this study and other reminiscence bump research (Janssen et al., 2011).

### 2.2. Participants

Environmental educators working in Environmental Education Centres were chosen for this study as they are demonstrating their values by acting positively for the environment which they are then expounding to future generations (Hart, 2003). The choice to question earlier reading as an influence on pro-environmental attitudes and behaviours came from the education-based research which states that the middle childhood years (from 6 to 12) are the formative years of social and pro-environmental awareness and development (Hart, 2003; Sobel, 1996). Development in this age group depends on engaging the child with direct and indirect experiences to encourage the higher order thinking skills (Kahn, 1999; Kola-Olusanya, 2005). Reading could also be considered significant if the participants remembered books from this pre-adolescent age then they would have overcome their childhood amnesia (Janssen et al., 2007) as recognised in the Memory literature and research. The demographics of the participants are detailed in Table 1.

**Table 1. Demographics of participants**

Age group	Male	Female	Total
Young (less than 10 years' teaching experience)	1	9	10
Mid (between 10 and 30 years' teaching experience)	8	9	17
Older (more than 30 years' teaching experience)	2	2	4
Total	11	20	31

### 2.3. Coding

As differing ages of influence were recognised as a potential indicator of interest, the children's reading was categorised into ages of childhood reading. Categorising young people's reading is difficult as division by genre is not undertaken by authors, editors, publishers or educators. The divisions of text are usually into fiction or non-fiction and then within the fiction section, the texts are in five junior fiction categories.

The first of these five categories is "picture books" which are books of 24–32 pages usually with a short word count. These books are designed to be read aloud to children before they have acquired reading skills. The pictures often tell a story and hold the interest of the child. Picture books may, however, be aimed at all age groups. The second category of children's books is "early readers", which are written for children just starting to read and these usually rely on specific easy word lists. The third category is "chapter books" which have a simple storyline and challenge young readers. The fourth category is "middle grade" books, where the concept of a series of books becomes popular. The fifth and final category is the "young adult" books, aimed at the 12 plus age group, designed to address social issues, and growing up (Wallin, 2010). These categories were deemed too vague for this study, and publishers' recommended ages were chosen as the appropriate coding categories.

The publishers' age category system covered all the books mentioned in the interviews of the participants' childhood reading, including books from all the children's categories and texts from adult categories of literature. As the publishers' age categories are more specific than required for this study, the age groups in the tables in the Results are broken at the ages Sobel (1996) suggests are indicative of changes of children's spheres of interest, up to 7 years of age, 8–11 and 12 years and over.

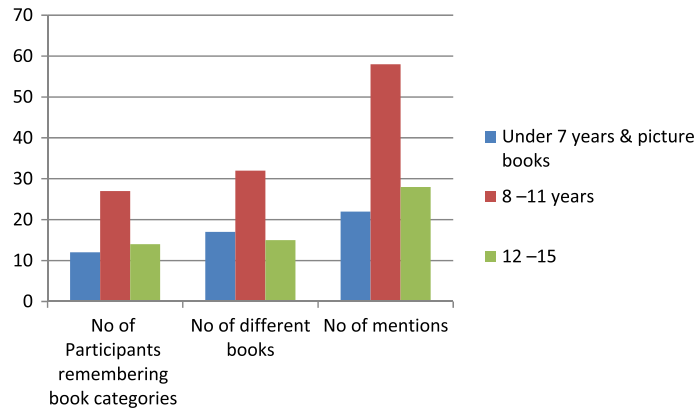
The reading age suggested by each publisher for the books and authors recalled by the participants was chosen as a suitable method of coding the data as participants' accurate recall of the specific reading age for the books was difficult to determine. An example of this was one participant recalling reading May Gibbs *Snuggle Pot and Cuddle Pie* (reading age 4 years plus) when responding to the question about high school reading. The reading material recalled by the participants was predominantly fictional material, with some mentions of science based material, such as encyclopaedias and magazines such as National Geographic.

### 3. Data & discussion

The numerical data collected can be described as descriptively qualitative as it is based on an analysis of the rich interview data. As this article is focusing on the numbers of different types of books, the data are presented in graph form to make the frequencies easier to see. Details on the participants' comments on their early reading and their scripts to their own stories are available in another article (Freestone & O'Toole, 2014), which focuses on the types/genres of literature read by the participants.

Three participants recalled only scientific type texts, such as encyclopaedias or information texts leaving the remaining 28 of the 31 participants recalling favourite or memorable fictional stories. The participants named 128 fictional books in their interviews about their reading during their school years. Half of these were categorised as children's books, and the remainder were adult texts. Of those, 24 participants listed adult reading material from their formative years. Graph 1 looks at the children's books listed and is comprised of three sections. The left-hand section shows that the largest number of participants remember books written for children in the 8–11 age range; the middle section of the graph shows that the greatest number of individual books and authors listed is also in the 8–11 age range; and, as some books were recalled by more than one participant, the right-hand section shows the number of mentions by participants. The recall of a lower number of teenage books is significant as the memory literature suggested that books written for this age group should have been more common than these results suggest.

**Graph 1. Showing the popularity of the 8–11 age range in participant responses.**



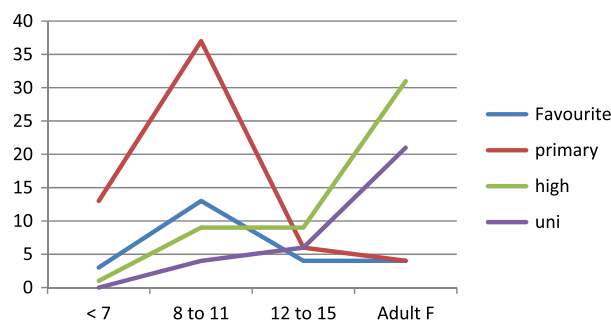
As Table 2 shows, use of the publishers’ ages for books recalled by the participants indicated that these environmental educators recalled reading as many adult books (64) when younger as they did children’s books (64). The high recall of adult books and authors by participants supports the adolescence/early adult “reminiscence bump” in memory recall.

Graph 2 examines the data by placing it in categories by participant responses to the specific interview questions of when participants recalled reading the books, those of primary school, high school or university and with their favourite reading—which did not specify an age. A recall spike still

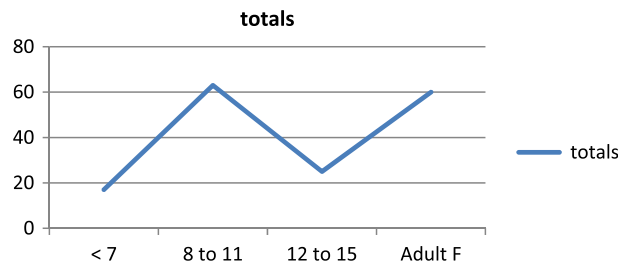
**Table 2. Young fictional books by publisher’s categories**

Text type	No. of participants remembering book categories	No. of different books	No. of mentions
Under 7 years & picture books	12	17	22
8–11 years	27	32	58
12–15	14	15	28
<b>Total child reading</b>		<b>64</b>	<b>108</b>
<b>Total recalling participants</b>	<b>28/31</b>		
Adult books and authors recalled as childhood reading	<b>24/31</b>	<b>64</b>	<b>99</b>
<b>Total numbers in childhood reading</b>		<b>128</b>	<b>207</b>

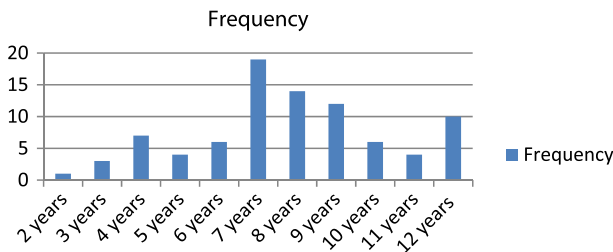
**Graph 2. Showing the number of responses to the age categories according to questions about when participants recalled reading the books.**



**Graph 3. Recall of books by publisher's recommended reading age.**



**Graph 4. Publishers suggested youngest age for reading listed books.**



appears in the 8–11 age range before the accepted reminiscence bump of adolescence and early adulthood.

If all the totals from Graph 2 are combined, as in Graph 3, then the 8–11 age group is still a significant spike before the accepted reminiscence bump.

Graph 4 uses the publisher's youngest recommended reading age for the children's books listed by the participants. A spike at the age of 7 appears on the graph. This indicates that publishers target these books for readers beginning at ages 7, 8 & 9. This is potentially due to this being the accepted age of starting independent reading (Samuels & Farstrup, 2011).

#### 4. Discussion

As stated above, this study set out to discover what participants' reading appeared to be influential in their lives and when this reading occurred. The finer grained data from this study indicate that there appears to be a noticeable spike in the recall of the participants between the reading ages of 8 and 11 which is before the recognised adolescence and early adulthood reminiscence bump. The data also confirmed the reminiscence bump with a large recall of adult books in school and university reading recall. However, the spike in the 8–11 age group was unexpected and prompted a search in other related disciplines to see if this age group lined up with their findings. The investigations show that the 8–11 age group uncovered in this study parallels similar aged significant periods of development within other related disciplines. How this discovery sits within current areas of research is discussed in the following subsections.

##### 4.1. Memory ages

Research into individual's memories by Janssen et al. (2007) states that adults retain three or four ages of autobiographical memories of varying complexity and depth, depending on the age of the subject. These autobiographical memories are listed as (1) "childhood amnesia", where few memories remain, (2) the "reminiscence bump" of adolescence and early adulthood where many memories are recalled, then (3) a period of few memories before the final (4) "recency or retention effect" of memories from the last few years (Janssen et al., 2007, pp. 755–756). Studies identify adolescence and early adulthood as the period of life when individuals experience the reminiscence bump (Janssen et al., 2011; Larsen, 1996; Rathbone et al., 2008; Rubin et al., 1998). These studies show minor differences in the ages consistent for the reminiscence bump, with the consensus age group being

10–30 years of age. However, Janssen's study identifying subjects' memories of favourite books (Janssen et al., 2011) lists the age of best memory as the very broad range of 10–40 years of age.

Janssen and colleagues identify one of the difficulties in assessing the age of the reminiscence bump is the method of the age groupings used in the data collection. As highlighted in this article, data on participants' ages have often been in decade "bins", where as their more recent internet study used 5-year age bins.

The finer grain of this study, looking at specific recommended ages for reading in school-age years shows a spike in the 8–11-year age group before the reminiscence bump and highlights/draws attention to the possibility that the earlier incidence of recalled reading may influence people.

The participants in this study were asked to freely recall the stories and authors rather than using cue words or the other methods used to generate recall from participants that have been used in previous studies into the reminiscence bump (Janssen et al., 2011).

#### **4.2. Appreciation of nature by stages of development**

Different ways of appreciating nature at different ages are also recognised within environmental education. Kellert (2002) suggests that the first age for an individual's perspective of nature as occurring between the ages of 3–6 years with nature fulfilling the child's material needs and providing comfort and security. This is also the age where children are learning to count and recognise or name objects in nature (Kellert, 2005). The second stage is identified as middle childhood, from 6 to 12 years of age, when children are appreciating natural creatures for their differentness and other settings in the wild piquing their curiosity with the most dramatic increases in children's understanding of nature in the age range of 9–12. Here Kellert (2005) recognises that children's fantasy stories may become entwined with their nature experiences, providing memorable emotional encounters. Then between the ages of 13–17 years, children exhibit an increase in their abstract reasoning and ecological and moral values "by treating other creatures with moral consideration" (Kahn, 1999, p. 18).

Sobel (1996) defines the formative stages of understanding nature based on the child's area of interest. Starting with the first stage in early childhood, 4–7 years, where children are interested in their home environment and the companion animals they recognise and play with there. The second stage is middle childhood, 8–11, when children become more adventurous in their local area; and the third stage, from 12 to 15 and beyond is where their area of influence encompasses the social space of where teenagers meet together, such as in a shopping centre. He sees involvement and empathy building with animals as important in the first stage, followed by adventures in the natural environment in the second, and social and moral action as appropriate in the third (Sobel, 1996, pp. 13–27).

These age groupings are used within environmental education to ensure that appropriate experiences can be provided for students when they visit environmental education centres.

#### **4.3. Reading ages**

Children learn to read at different ages, with many in developed countries beginning their reading experience by being told or read stories from picture books (Guthrie & Greaney, 1991; Meek, 1988; Shelley, 1990). The child's interest in books then develops with their imaginations (Shelley, 1990) encouraging an increasing interest in new topics. While children's books are written to publishers' criteria of word count and complexity of language (Wallin, 2010), the topics of the texts are not defined. Once the books are published, suggested reading ages are often omitted from the books because individuals learn to read at different rates (Zwartz, 2009).

This study into the reading habits of environmental educators used publisher's recommended reading ages, along with the educational perspective of age groupings, as used by Sobel's (1996) age



categories. These parallel reading experience categories are used here to address the issue of suitable literature for certain age groups. This means the recommendations are separated into three main areas: the pre-reading age group and early readers, ages 4–7; the adventurous middle childhood school children, ages 8–11; and the dawning socially aware adolescents, 12–15 years of age.

The ages of reading also coincide with these stages of development, with the recalled reading material appearing to be under 7 years, from 8 to 11 and the third grouping over 12 years. The reading age of 8–11 is recalled by the highest number of the participants in this study (Graph 1). Middle childhood, covering the ages 8–11, appears as a significant time of influence for reading, emotional influence and attitude and value formation (Hart, 2003; Kola-Olusanya, 2005).

#### **4.4. Reminiscence bump**

Can this age group (8–11) really be called the adolescence/early adulthood reminiscence bump? Rather, it appears to be a pre-adolescence spike before the recognised reminiscence bump.

The results in Table 2 show that number of adult books listed as remembered from childhood reading (64), is the same as the number of children's books listed (64). However, the number of mentions of adult books (99) is slightly fewer than the children's books mentioned (108). These similar numbers are important as, according to the memory research discussed, childhood amnesia should reduce the number of childhood books remembered, especially under the age of 11 years. The literature states that the reminiscence bump of better memory begins in adolescence and early adulthood, so more books should be remembered from this period of the participants' lives. However, the recall of the large number of books from the middle childhood age group implies that this age, as well as adolescence, was an important and influential time for the participants in this study.

The overwhelming number of memories of early stories that participants revealed suggests that these books impacted on their sense of self and influenced their attitudes and values which in turn influenced their actions.

#### **4.5. Significance of the memories in value formation**

Research suggests that if participants recall childhood books it is because they are particularly relevant to their life or recent situation (Janssen et al., 2007). It would appear that significant memories of these texts may be what is known as a Sleeper Effect, where remembered information has been gathered from an unusually vivid or relevant experience (Gordon, Gerrig, & Franklin, 2009) and may increase in importance for the individual over time (Appel & Richter, 2007).

The individual's use of information accompanied with a lack of conscious memory of the source of information is significant in this study as the participants' attitudes and ongoing knowledge are influenced by the information they have accumulated. Memories of special events or significant life experiences are often stored with emotions that act as prompts or cues to his/her remembering the specific information or adding to their prior knowledge (Blakemore & Frith, 2005; Mazzocco et al., 2007; Sousa, 2006). Larsen's (1996) study examining reading habits of three generations of Scandinavian families reports that significant memories of favourite books were often associated with significant personal memories of the time. These memorable texts were often read when the participants were in early adulthood and that "at least some of the memories apparently become a long-lasting ingredient of one's life history in the same way as some personal experiences ... reading is not only for momentary pleasure, but for life" (p. 589).

#### **4.6. Reading, memory and learning**

This then aligns with the constructivist paradigm which accepts that as individuals we build on information we receive to produce new knowledge and to generate an understanding of specific situations. When we learn, we construct meaning from our own personal experiences by building or constructing new knowledge by synthesising the new information with our existing knowledge to

construct further understanding (Creswell, 2009; Guba & Lincoln, 1994; Kahn, 1999; Robottom, 2004).

Research into readers' preferences in texts indicates that for some individuals, specific transformative books have opened the individual's eyes to a different perspective on a subject and changed their beliefs or attitudes to aspects of the world. Sheldrick Ross (1999) reported that sometimes the encounter with a significant book was accidental, since the book was read initially for some other purpose. In about one quarter of all reported cases, readers said the book was a model for living ... offered examples to follow, rules to live by, and sometimes inspiration. In some cases, reading changed the readers' beliefs, attitudes or pictures of the world, which change in turn altered the way readers chose to live their lives after the book was closed (Sheldrick Ross, 1999, p. 791).

Fiction has been found to be a well-used and valuable learning experience for children (Fazio & Marsh, 2008; Morrow & Gambrell, 2000) as it may be used to provide reassurance, moral guidance, explanations and warnings in a readily understandable and acceptable format, as well as providing recreational entertainment (Gabriel, 2000). Fazio and Marsh (2008, p. 1088) state that "Fictional stories can be a valuable learning tool for elementary school students. After listening to correct information embedded in a story, children are more likely to produce that correct answer on a later test". Morrow and Gambrell (2000) also report on a number of cases where deliberately chosen literature has enhanced school students' understanding across a broad range of learning areas, such as scientific concepts, recall of historical information and social concepts of other countries. This study shows that the potential of judicious use of fiction in a learning environment with this younger age group (8–11 years) could influence subsequent life choices.

#### **4.7. Limitations in this study**

While the small number of participants (31) from a select cohort is appropriate for such a qualitative study, much broader studies would be required to uncover if this middle-childhood-age story book recall spike is more generalised. There is potential for further research into this apparent spike to investigate if professionals in other disciplines show a similar trend in recall of stories from their middle childhood. This may indicate that the reading matter of this stage in life is better remembered and has a greater influence than currently understood. Longitudinal studies examining the reading material of students of this age group and then examining their memories and values at later stages in life would also shed more light on the potential value of middle childhood reading in forming values and lifelong choices.

### **5. Conclusion**

**What reading age group appears to be most recalled and therefore most influential in life choices?** Using the data collected and the publishers' recommended age groups for reading, the age group of books most recalled appears to be from middle childhood, from ages 8 to 11. Participants also remembered a high number of adult books within their formative reading. This indicates that the participants are in step with the research on memory with their recall of events and books from their adolescence and early adulthood, but out of step in their high response rate of recall of books from middle childhood where childhood amnesia should have significantly reduced the number of texts remembered. This spike in recall from the middle childhood age range suggests that these books were significant to the participants, implying that these books are particularly influential during the formative ages of these participants.

Research opinions vary as to the most influential time for exposing audiences to life-changing information. Most educationalists see that the three ages of childhood are approximately up to 7 years of age, 8–11 years and over 12, with the most important age of influence being the middle one

(8–11 years) as it is when children began to develop their independence in relationships, in exploring their environment and in choosing their reading material and interests. However, while educationalists see this as an important time, memory specialists see that the reminiscence bump of adolescent and early adulthood as the most often remembered times. As participants in this study recalled books from before their adolescence, this reminiscence spike may be particularly significant as the memories have survived and surfaced despite the childhood amnesia stage.

This research shows that reading in late childhood may be more important than earlier research indicated.

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