

Autobiographical memory in the visually impaired: initial findings and impressions

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Abstract

We examine memory for personal events in a group of visually impaired children/young adults using a semi-structured interview technique and a word cueing task. Memories were assessed for specificity, detail and emotional and sensory content. We also investigated the age of earliest memory. The data suggests that visual impairment may be associated with a less detailed memory for personal experiences and a later onset of personal memory.

Possible mechanisms which contribute to the characteristics of autobiographical memory in visual impairment are discussed.

Autobiographical memory is memory for information related to the self and is comprised of biographical information and personally experienced events. In describing the nature of autobiographical memory, Brewer (1986) noted that personal memories are almost always accompanied by visual imagery. Indeed Brewer states that "the strong component of visual imagery in personal memory suggests that it might be of interest to study personal memory in blind individuals" (p. 34). A literature search however, revealed very little recent research in this area so we set out to resolve this shortfall. Here we report some initial findings of our ongoing research examining autobiographical memory in the visually impaired.

A case study reported by Ogden (1993) provides a strong argument for a critical role of visual imagery in autobiographical memory. Following a motorbike accident, M.H., sustained lesions to his occipital lobes resulting in visual agnosia, prosopagnosia, achromatopsia and a poor visual memory. A consequence of M.H.'s brain damage was a severe deficit in his ability to retrieve personal experiences occurring prior to his accident. Whilst memory for events after his accident was also diminished, his retrograde amnesia was much more severe. Ogden suggests M.H.'s retrograde amnesia was a result of his inability to use visual cues for these older memories that were stored visually. Prior to his accident M.H. is likely to have used visual imagery to aid memory but now he must learn to attend to non-visual aspects of new episodes. Thus the events he remembers now involve other senses i.e., sense, smell, taste and strong emotional reactions. M.H.'s anterograde amnesia may therefore be due to inexperience in storing memories in modalities other than the visual. These findings suggest that in the absence of visual impairment, visual imagery plays an important role in storing personal experiences and that memory retrieval is facilitated by visual cues. With respect to the visually impaired then it is likely that other sensory modalities guide memory storage and retrieval processes. Autobiographical memory may therefore feature events dominated by other sensory modalities and may also be more emotional given that, in the absence of vision, emotion may act as a powerful tag for memory storage.

The role of imagery in the quality of autobiographical remembering has also been explored by Williams, Healy & Ellis (1999). In a series of studies using a cueing task paradigm, Williams et al. manipulated a] the imageability of cue words and b] the sensory modality of cue words and examined how these variables influenced the ability to generate specific autobiographical memories. Specific memories describe individual events recalled within their context and are usually operationalized as referring to one particular day e.g., “going out with my friend last week for dinner”. In contrast general memories represent experience at a more abstracted level where contextual details are lost e.g, “when I’m with my boyfriend” or “my holiday in Italy last year”. Williams et al. showed that the more imageable the cue word the more specific the memory retrieved. Furthermore, cue words with high visual associations were significantly more likely to elicit specific memory retrieval as opposed to cue words high in auditory, motor, olfactory and tactile associations. These findings suggest that autobiographical memory in the visually impaired may be characterised by a lack of specific memories and predisposition towards general memories. Alternatively memory processes may be different such that sensory modalities other than the visual become finely tuned for eliciting specific memories.

We were also interested in the age of onset of autobiographical memory. The phenomenon of infantile amnesia, i.e., the inability to recall events from very early childhood in later years, has evoked a great deal of interest. One contemporary explanation emphasises the role of the self in autobiographical memory development. Howe & Courage (1993, 1997) propose that the development of the self-concept is crucial for autobiographical memory because the self serves as a base around which to organise personal experiences. Two accepted benchmarks of self-concept development are self-recognition and correct pronoun usage. These abilities usually transpire around the age of 2 years. However, in some groups, notably autistic and the blind these skills are either not acquired or delayed. Research has found congenitally blind children to have greater difficulty with correct pronoun usage and they continue to reverse "I" and "you" in their preschool years (Frailberg, 1977; Minter, Hobson & Pring, 1991) Moreover the onset of self-recognition, as

assessed by identification of their own voices on tape, does not occur until around 4-5 years (Frailberg, 1977).

Another influential theory of autobiographical memory states that social interaction is the key ingredient to the development of autobiographical memory (Nelson, 1993). Autobiographical memory develops once the child has learnt how to talk about past experiences in a narrative form. This skill is enabled through conversations with significant adults. Research examining early interactions between blind infants and their sighted mothers has found a delay in communication and sharing of experiences (Preisler, 1995). Thus both the self-concept theory and social interaction model lead to the prediction that the earliest memories of the visually impaired will be from a later age than that of the sighted.

In summary we were interested in whether the specific autobiographical memory system of blind individuals was either impaired due to the unavailability of visual cues for storage and retrieval or whether other sensory modalities would be equally effective in the storage and retrieval of personal experiences. We were also interested in the general characteristics of autobiographical memory, for example whether emotional aspects of events would feature strongly. Finally we were interested in the phenomena of infantile amnesia and whether the visually impaired would report their earliest memories to have occurred at a later age than the sighted.

We used two methods for eliciting memories. First, an interview procedure adapted from Han, Leichtman & Wang's (1998) study which examined autobiographical memory retrieval style in Korean, Chinese and American children. This procedure demonstrated marked differences in the quality of autobiographical memory across the three cultures with Americans children more specific and more voluminous. We used their findings as a basic gauge with which to compare our blind data. Our second measure of memory was a word cueing task. This requires participants to retrieve specific memories to cue words at speed and acts an index of memory specificity. It has been used on numerous occasions particularly with clinical groups (e.g., Williams & Scott, 1988). Therefore

norms exist upon which we can make some comparison between our visually impaired participants and other sighted control groups.

Method.

Participants

Our sample consisted of 8 children/young adults, 7 of whom were male. Their ages ranged from 11 to 19 years, mean = 14.96, (sd = 2.88). Five participants had been blind from birth and the remaining three had lost their sight at the age of ? - around 5(*Anymore details needed here Linda?*)

Procedure

Participants were first interviewed with a procedure modelled on Han et al's (1998) study. This was an exploratory study and so although the interview was to a large extent standardised we nonetheless used prompting where needed in order to elicit as much information as possible. The original interview consists of six questions designed to elicit memories of specific events. In addition to these six questions we asked participants to recount the first birthday that they could remember and we also asked them to report how old they thought they were at the time of their earliest memory. See Table 1. for details of interview. The interview therefore consisted of 7 items for which a narrative response was required.

Table 1. Interview items.

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1. Can you tell me about all the things you did at bedtime last night? Tell me everything you did after you ate dinner until right before you went to sleep.
 2. Now, can you tell me everything you did when you woke up this morning?
 3. Now I'd like you to tell me just one thing you did recently that was really special and fun
 4. How did you spend your last birthday?
 5. Now can you tell me about a time, these days, when your mum or dad scolded you for something?
 6. (i) You know, some kids can remember things that happened to them when they were very little. Can you tell me the first thing that ever happened to you, that you can remember in your whole life?
(ii) How old do you think you were when this event occurred?
 7. (i) What's the very first (i.e., earliest) birthday that you can remember?
(ii) What did you do for that birthday?
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The cueing task consisted of the following 5 positive and 5 negative emotion cue-words: happy, sorry, safe, angry, interested, clumsy, successful, hurt, surprised, lonely. Participants were instructed to retrieve a specific event, something which happened on one particular day, as quickly as possible. Latencies to retrieve memories were recorded.

In terms of the interview responses we were interested in the following qualities of memory:

Specificity. The extent to which memories were specific vs. general. We attributed a score of 1 to each response which contained some reference to an individual event (e.g. going to the funfair with my mum and brother last month). Where the memory response was general (e.g., I enjoy swimming) or there was a failure to recall a memory, we gave the item a score of 0. The maximum specificity score was therefore 7.

Level of detail. Here we were interested in the volume of the narrative.

Emotion. We were interested in whether the narratives contained some affective content.

Description of sensory details. We examined memory narratives for references to sensory details.

Age of earliest memory. This was elicited by asking participants how old they were at the time of their first memory (item 6ii) and what was the very first birthday that they could remember (item 7i). The younger age was deemed age of earliest memory. A previous study examining earliest memories of young adults has found the mean age to be 44 months (Wang, Leichtman & White, 1998).

We report our impressions on the above dimensions. As regards the cueing task, we measured time taken to retrieve memories and we also calculated the number of responses which were specific.

Analysis of memory narratives and cueing task performance.

First we examined the specificity of the interview responses. All 7 items require that the participant retrieve a specific event. The mean number of items where specific events were recalled

was 5.50 (sd = 1.07). This is comparable to Han et al.'s study where mean specificity scores for 6 items were 4.3, 3.57 and 3.28 for American, Korean and Chinese children respectively. Data from the cueing task also showed specificity performance to be equivalent to control group performance. Non-student control groups on average offer specific memories to 80% of cue words. The mean specificity performance here was 76%. Latencies to retrieve specific memories did appear on the slow side with a mean response time of 17.32 seconds: typically mean response times are around 9 or 10 seconds. Nevertheless, the comparison, although rather crude, suggests that the visually impaired are able to retrieve specific memories to a degree that is comparable with sighted individuals.

Further examination of the interview responses revealed two interesting findings which we hope to elucidate in our further research. First, in many cases our participants required a great deal of prompting in order to report something specific. Second, a striking feature of the data was the paucity of detail in the narratives. Many of the responses resembled factual statements rather than reconstructions of events. We give some examples below (all names are changed to ensure anonymity). Each example refers to a different respondent.

Example 1.

Experimenter (E): Can you tell me everything you did when you woke up this morning?

Participant (P): It was quite late. When I wake up I can never get out of bed. If I can help it, I just can't get out of bed straight away. I could go back to sleep easily.

E: This morning, did anything special happen?

P: No I woke up late, it was just about 8 minutes before breakfast. I jumped up and got washed and went to breakfast.

E: Who was there at breakfast time, can you remember?

P: Staff

E: Did you sit with anyone?

P: Freddie and Louis were there, everyone was there, most of them anyway.

Example 2.

E: Can you tell me about all the things you did at bedtime last night? Tell me everything you did after you ate dinner until right before you went to sleep.

P: ummm, I went to scouts. I played last night.

E:What did you play last night?

P: We played skittles

E: Was it good?

P: Yeah

E: What did you do after scouts?

P: Went to bed

Example 3.

E: Can you tell me about all the things you did at bedtime last night? Tell me everything you did after you ate dinner until right before you went to sleep

P: Sat in the common room. Chatted with my friend.

E: Which friend?

P: Cameron

E: What did you chat about?

P: Anything. What we did at the weekend

E: What did you do after that?

P: Went swimming

E: After dinner, in the evening? I am talking about what you did last night just before you went to bed.

P: I didn't eat dinner at Cleavdon, I had it at school. Then just chilled out in the common room after that. Then it was time to go swimming.

E: After that?

P: Had a phone call then went to bed.

E. Did you listen to a tape

P. No I had a chat to Richard. I chat to my friend.

E. Then you both went to sleep?

P. No me Richard and Cameron

E. You all sleep in the same bedroom?

P. Yes. Just for this term then next term I go back to my old room.

The above demonstrates that respondents were able to retrieve specific memories but how this was to some considerable extent dependent on prompting. Han et al.'s study revealed American children's narratives to be more detailed and descriptive than Chinese and Korean children's'. They found Korean children to be particularly lacking in detail. We can compare their Korean example with our own. The following narrative is a response to "tell me everything you did at bedtime last night".

Korean child: I played with my sister.

Interviewer: What else did you do?

Korean child: I washed my face and brushed my teeth

Interviewer: What else?

Korean child: Then...I watched T.V. and after a while, I fell asleep.

While the above example is to some extent equivalent to our data, it still requires less prompting and yields more detail than our examples.

We then considered the extent to which the narratives from our study contained emotional material and sensory details. There was little evidence of either aspect in the memories. These findings reinforced our opinion that the memories, rather than conveying the respondent's experience were more akin to verbatim reports. Finally we examined the age which respondents reported as pertaining to their earliest memory. One respondent was unable to recall her age at

earliest memory. The remaining 7 respondents yielded a mean age of 41 months. This is equivalent to previous findings where average age of memory has been found to be 44 months (Wang et al., 1998). However the veracity of some reports of early memories was doubtful: one respondent remembered an event immediately after his birth and another remembered an event which occurred at 6 months. Recollections at such an early age are highly unlikely. Excluding these two cases yielded a mean score of 56 months which does suggest that the earliest memories of the visually impaired may be later than those of the sighted.

Discussion.

In this study we attempted to examine the quality of autobiographical remembering in the visually impaired. Without proper control data our conclusions are tentative. We are currently engaged in obtaining sighted control data. In the meantime, we present our initial impressions.

We were surprised at the substantial prompting which was needed for eliciting information about recent and remote events. This could be due to the dynamics involved between a sighted interviewer and visually impaired participant and thus a methodological flaw of our study. Alternatively prompting may have been necessary because, for the visually impaired, remembering even very recent events requires considerable effort. Our future research aims to shed light on why retrieval mechanisms may result in poor memory.

Related to the need for prompting, our second main impression of the memory reports was their considerable lack of detail. It appeared as though participants were not consciously recollecting previous events: rather they were giving verbatim reports of factual aspects of their life. On the surface it would seem that it is difficult to replace visual information with other sensory data, which can act as a powerful medium for storing and retrieving personal experiences. One consequence of this may be to redirect memorial processes towards non-personal material. Research by Pring and colleagues (Pring, 1988; Pring & Mulkern, 1992; Pring & Painter, 1996) suggests that profoundly visually impaired children have better recall of verbal information than do sighted

children. Therefore a trade-off between verbal memory and autobiographical memory may exist where attentional resources are directed towards verbal rather than personal material.

The lack of detail in the specific memory reports made it difficult to gauge the veridicality of memories. For instance when asked to retrieve a specific memory for the word "angry", one respondent reported "..when nobody is listening to what I am saying. When nobody is talking to me..." when asked for one time when that happened the participant responded with "last year or the year before". This made accurate scoring of the cueing task difficult; a stricter criteria for scoring may have revealed poor specificity performance. A further example concerns an incident where a participant reported remembering their brothers being born but could not recall any details associated with the event. With the present study it is difficult to establish whether the lack of detail is due to an inability to reconstruct the event or a lack of motivation to report it in detail.

In conclusion our research this far suggests that a lack of vision may have profound effects on autobiographical memory processes. Our data also suggests that the age of earliest memory may be later in the blind. It is widely believed that autobiographical memory has many social functions. Previous studies have shown its importance in imagining future events (Williams, Ellis, Tyers, Healy & Rose, 1996) and solving personal problems (Goddard, Dritschel & Burton, 1996). The self-schema is also likely to be inextricably linked with autobiographical memory. We are currently investigating how autobiographical memory processes in the visually impaired may impact upon conceptions of the self.

References.

- Brewer, W.F. (1986) What is autobiographical memory? In D.C. Rubin (Ed.) Autobiographical memory. pp.25-49. Cambridge University Press.
- Frailberg, S. (1977) Insights from the blind. New York: Basic Books.
- Goddard, L., Dritschel, B. & Burton, A. (1996) Role of autobiographical memory in social problem-solving and depression. Journal of Abnormal Psychology, 105, 609-616.

Han, J.J., Leichtman, M. & Wang, Q. (1998) Autobiographical memory in Korean, Chinese and American children. Developmental Psychology, 34 (4) 701-713.

Howe, M.L. & Courage, M.L. (1993) On resolving the enigma of infantile amnesia. Psychological Bulletin, 113, 305-326.

Howe, M.L. & Courage, M.L. (1997) The emergence and early development of autobiographical memory. Psychological Review, 104, 499-523.

Minter, M.E., Hobson, R.P. & Pring, L. (1991) Recognition of vocally expressed emotion by congenitally blind children: A research note. Journal of Visual Impairment and Blindness, 85 (10) 411-415.

Nelson, K. (1993) The psychological and social origins of autobiographical memory. Psychological Science, 4, 7-14.

Ogden, J.A. (1993) Visual object agnosia, prosopagnosia, achromatopsia, loss of visual imagery and autobiographical amnesia following recovery from cortical blindness: Case M.H. Neuropsychologia, 31 (6) 571-589.

Preisler, G.M. (1995) The development of communication in blind and deaf infants – similarities and differences. Child Care: Health and Development, 21 (2) 79-110.

Pring, L. (1988) The 'reverse-generation' effect: A comparison of memory performance between blind and sighted children. British Journal of Psychology, 79, 387-400.

Pring, L. & Mulkern, K. (1992) Memory in blind and sighted children. European Review of Applied Psychology, 42 (3) 243-248.

Pring & Painter (*****

Wang, Q., Leichtman, M.D., & White, S.H. (1998) Childhood memory and self-description in young Chinese adults: the impact of growing up an only child. Cognition 69, 73-103.

Williams, J.M. G., Ellis, N.C., Tyers, C., Healy, H., Rose, G. & MacLeod, A.K. (1996) The specificity of autobiographical memory and imageability of the future. Memory & Cognition, 24, 116-125.

Williams, J.M.G., Healy, H.G. & Ellis, N.C. (1999) The effect of imageability and predicability of cues in autobiographical memory. The Quarterly Journal of Experimental Psychology, 52A (3) 555-579.

Williams, J.M.G. & Scott, J. (1988) Autobiographical memories in depression. Psychological Medicine, 18, 689-695