The Process of Mental Imagery in Persons With or Without Intellectual Disability: An Exploratory Project

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Abstract

This study explores the process of mental imagery in 16 adults with intellectual disability. Results were compared with the responses of a group of 10 students. Photographs were briefly presented to the respondents; following the removal of the material each individual was asked to describe any mental imagery associated with the pictures. The nature of this imagery was then explored. All respondents were video taped and their verbal responses were analyzed. The results, largely qualitative in nature, question the ability of some individuals to regularly experience mental imagery, and also suggest that the ability to manipulate such imagery differs considerably between individuals and groups. The authors discuss the range of responses in terms of visual and other modalities. They speculate in this pilot study on the role and development of mental imagery and its relevance to learning and rehabilitation.

The development of quality of life programmes has opened the door for re-examining personal perception and choices made by individuals with disabilities. Although subjective, perceptions shape our behaviour (Andrews, 1974). There is a need to consider the perceived needs, choices, perceptions of life, and environment of individuals with an intellectual disability. Currently, a number of researchers employ methods to assess individuals' perception of their well-being, and quality of life (Cummins, 1997, Schalock et al., 2002).

Brown, Bayer and Brown's (1992) study on quality of life noted that some individuals experienced difficulty in providing details about their perceptions, despite adequate language ability. The question arises as to whether such individuals had no or little ability to imagine choices or actions, or whether they were unable to recognize and describe such behaviour. Statements were noted from consumers by Brown et al. (1992). For example, a participant when asked to think of swimming up and down a pool, laughed and said, "I

haven't got a mirror in my head." She could not do so. This may imply that she could not imagine herself swimming because she had no visual imagery. Similar examples of this type have been encountered, not just in the field of intellectual disability, but also in the area of head injury, where individuals claim they have no visual imagery or, in some cases, other sensory images.

Brown and Goldenberg, in an unreported pilot study, came across several examples where people with head injury were unable to image events. When reporting on these phenomena at an Ontario conference on head injury, Brown noted that several members of the audience, who had suffered traumatic head injury, reported they had lost the ability to image visually. In one case, a member of the audience claimed this imagery was returning after several years of absence. This has been recorded at a clinical level by other authors (e.g. Graham, 1995).

Many intervention studies and practices in rehabilitation implicitly rely on imagery processes. There are a range of therapeutic programmes, which assume that visualization and other modalities of imagery are possible for all individuals. If this assumption is incorrect, then the intervention methods themselves are likely to be redundant. Further, social and counselling programmes (e.g., Groden, Cautela, LeVasseur, Groden, & Bausman, 1991) that require individuals to rehearse internally or imagine various experiences may be inappropriate. The question then arises about the extent to which individuals with disabilities report imagery – internal experiences involving visual, auditory, tactile and kinesthetic modalities. To what degree do those who possess some ability in this field report versatile imagery, where images can be manipulated by the individual? There is also a question of whether the individuals are cognizant of the imagery processes they possess.

If mental imagery is, at least, partly learned and a social phenomenon, then individuals with intellectual disability who have a rich and supportive family life may be likely to show a strong imagery system, making use of a wide range of experiences. Yet many persons with intellectual disability have been subject to institutionalization or come from poor socioeconomic backgrounds, experiences which may be thought to reduce the likelihood of well-developed and positive imagery.

Research in this area confronts the problem of correlation between subjective statements and the presence or absence of phenomena. However research in quality of life has illustrated that there is considerable reliability and validity associated with client statements, which are repeatable and governors of behaviour. Statements reflect individual feeling and

perception and may be more potent than objective or external "realities" in determining intervention outcome (See Cummins, 1997; Goode, 1994; Schalock et al., 2002). Indeed, it seems inappropriate to regard perception as simply subjective. Brown and Brown (2003) have argued that statements describing perception are about internal personal views. Objectivity, they argue, should be formulated in terms of whether the statements are what the person feels and thinks, rather than being 'validated' using an external measure, which may represent a valid reflection of a situation, but irrelevant in terms of the individual's own perception.

The present research is aimed at exploring the above phenomena particularly, but not only in relation to visual imagery. The aims include noting the stated presence or absence of different forms of imagery. The intent is to describe reported mental imagery after attempting to provoke it, and to note the presence or absence of visual-motor behaviours, which might support such phenomena.

Method

Participants

The present research used 16 adults with intellectual disabilities that ranged from severe to mild and a contrast group of 10 students with no medical history of disabilities. All students were above 18 years of age. Details of age and gender are provided in Table 1. Oral and written consent were obtained from the individuals and, where appropriate, from their primary caregiver.

Table 1. Size and characteristics of groups in the study

Students (n= 10)

The 10 undergraduates were Bachelor of Applied Science (Disability Studies) students at Flinders University.

5 Females, 5 Males
Age Range; 19 yrs, 8 months to 50 yrs, 1 month
Mean Age; 27 yrs, 10 months

Individuals with an intellectual disability (n=16)

The 16 individuals all received support from an agency that provided services specifically for people with an intellectual disability.

(continued)

Table 1.   (cont'd)

All these individuals had experienced institutional living for varying stages of their lives.

9 Females, 7 Males
Age Range; 31 yrs, 5 months to 70 yrs
Mean Age; 43 yrs, 8 months

Results from Peabody Picture Vocabulary Test-Revised (1981) – Form L

Only 15 of the 16 participants with an intellectual disability were tested at this stage of the project. It was not possible to contact the one outstanding participant.

Raw Score Range; 47 to 109
Mean Raw Score; 80.87
Age Equivalent Range; 4 yrs, 3 months to 10 yrs, 4 months
Mean Age Equivalent; 7 yrs, 1 month (85.2 months)

Procedure

One of the challenges of working in the area of mental imagery is to find a suitable method for presenting data. Much of it is likely to be descriptive arguing for a qualitative methodology. We attempted to structure a formal situation that could be replicated and could provide some quantitative data in the form of behaviour counts, but to a large degree have relied, at this initial stage, on qualitative commentary.

Individuals were seen one at a time in a bare, windowless room. The room was selected in order to reduce the opportunities for stimulation of imagery. Each individual was seated on a chair facing a video camera, which was set at approximately 10 feet in front of the chair. A small microphone was attached to the individual's lapel. Each person was provided with oral information about the research by one of the researchers, who sat by the individual. Each individual was told that they would first be asked to define some words. Second, they would be shown a series of pictures, and third they could request to stop the research at any time or decline to answer any questions.

The authors decided, because of the varied backgrounds and abilities of individuals, to explore initially the understanding of specific phrases or words. The intent was to employ those words or phrases they understood in the later questions concerning photos so that, as far as possible, language would be familiar and meaningful to the person concerned. For example, individuals were asked to indicate the meaning of the words: "seeing", "vision", and "feeling", as well as the words "imagination", "brain"

and "mind." Exact definitions were not required. It was, for example, acceptable for the individual to point to their head when asked the meaning of the word brain or mind.

Each individual was asked in the following order to (a) think of a chair and describe it; (b) name a friend, and imagine the friend sitting on a chair; and (c) imagine taking a parcel to a car. Following this, each individual was presented with nine colour photos from magazines for 10 seconds each (see Table 2), and after each presentation was asked to describe what they had seen and any mental imagery of the presentation that they might possess. If they could do this, individuals were then asked to manipulate the picture images by placing themselves in the picture and imagining carrying out specific activities. Finally, they were invited to view a portion of the tape recording, which was found to be rewarding and even exciting for many of the participants. It also provided an opportunity for the authors to check immediately on the visual and audio recording.

Table 2. Photographs presented

1) Tent
2) Fire in hearth
3) Garden with pool
4) Woman doing limbo exercise
5) Man blowing out candles on a cake
6) Woman by a step-ladder with a cup in hand
7) Chef cutting food
8) Boat on lake
9) Hikers in the mountains

Following the collection of data, the tapes were analyzed for mental imagery. The mental imagery was categorized, and the results of this are shown in Table 3. Written notes were made during each session and these were used to check on audio and video content.

Results

It was possible to provide a list of descriptors of observed activities by reviewing the verbal responses of the respondents to the nine pictures and the accompanying videotape of behaviour of each participant. It was also possible to divide some of the response categories into approximate degrees of magnitude (e.g., detailed, basic and absent). These levels or ranking are included in Table 3.

Table 3. Mental imagery in adults with intellectual disability and the student group

Category	Intellectual Disability (n=16)		Students (n=10)	
	S*	%	S*	%
Spontaneous verbal description while viewing photo	8	60	0	0
Post photo presentation				
Modalities described**				
Visual				
Spontaneous	14	87	10	100
Provoked***	2	13	0	0
Auditory				
Spontaneous	4	25	5	50
Provoked	3	19	4	40
Tactile				
Spontaneous	0	0	5	50
Provoked	7	44	5	50
Olfactory				
Spontaneous	0	0	2	20
Provoked	7	44	5	50
Gustatory				
Spontaneous	0	0	0	0
Provoked	6	38	8	80
Kinesthetic				
Spontaneous	0	0	3	30
Provoked	3	19	5	50
Personal involvement in one or more post photo responses	14	88	10	100
Gross eye movements noted	9	60	10	100
Colour spontaneously described	15	94	4	40
Expansion on basic image	8	50	10	100
Spontaneous laughter at imagery	8	50	8	100
Presence of dreaming at night	6	38	10	100
Dreams involving movement	5	31	10	100
Dreaming in colour	3	19	10	100
Verbal levels of image (Highest level of verbalization (3) x No. Individuals)	16/48 (A/P)****	33	23/30 (A/P)	77
Action & movement described (Highest level of motor (4) x No. Individuals)	10/64 (A/P)	15 (A/P)	10/40	25

*S: number of individuals making response
**Percentages rounded to whole number
*** Provoked: only recorded after lack of spontaneous response
****A/P=Actual score/Possible score

Certain responses were categorized and weighted, and the highest score attained in the each area (motor and verbal) was the one recorded for each individual. For example, motor movement was weighted from zero, (no evidence of motor movement), through to four, (major motor movement observed), thus giving a potential score of 64 (i.e. 16 respondents x 4 maximum score) for the disability group and 40 (i.e. 10 x 4) for the total student group. Verbal level was also rated from zero through basic (1), or mixed (2), and detailed responses (3). This resulted in a possible score of 48 for the group with disabilities and 30 for students. These ratings were judged from videotapes, and both researchers independently found they could clearly calibrate using this scale. The data were also reported as percentages so that the reader can get some idea of the relative frequency of events in the two groups.

The quantitative data were derived from the qualitative responses of each participant after the picture was removed. In the following ways: 1) an indication of visual imagery could be made from the verbal comments (e.g., "I did get picture but now it has gone", "No, I can't. Its gone blank", and "A guy blowing out candles" and, "I see herself warming her hands"). 2) The nature of eye movements was noted when individuals commented on their mental image. For example, an individual might look upwards or downwards, right or left, without appearing to focus on or note objects in the room while describing their image (e.g., "Can you see it?" "Yeah" (leans back to look upwards)). 3) It was also noted whether individuals used colours in their description. 4) Some descriptions suggested that the individual had become personally involved with the image (e.g., "I am standing on the ladder"). 5) It was also noted whether this personal involvement was spontaneous or provoked. 6) Individual expansion of content, and spontaneously providing action or movement, rather than static description were also recorded. For example, did the individual imitate the action they had seen or use motor movements, for example, miming rowing in a boat.

Different types of image description were noted through six modality areas (see Table 4). In the examples that follow, "ID" is used for a response from a person with intellectual disability and "S" for a student.

Table 4. Image description across modalities

Visual: Response to woman on stepladder – "I can see the cobwebs from the top of the ladder" (ID).

Auditory: Response to hikers in the mountains – "Yeah, I can hear people talking" (ID).

Table 4.   (cont'd)

Tactile: Response to being in the hearth – "Yes. In my mind, warm" (ID).

Olfactory: Response to man blowing out candles – "I smell the candles after they have been blown out" (S).

Gustatory: Response to woman on stepladder holding cup – "I could imagine taking the cup of tea and putting it into my mouth. I feel the warmth of it" (S).

Kinesthetic: Response to woman doing limbo exercises – "You get it in the joint (places hands underneath the knees)" (ID).

Responses related to emotions were recorded; examples included showing anxiety or pulling a face indicating fear; responding to a request to imagine climbing a ladder: "I can, but I'll freeze" (S); or laughing at descriptions provided after pictures had been removed.

Responses related to dreaming were also recorded (e.g., "Oh, [I dream] about my auntie." "Can you see your auntie now, in your mind?" "No only at night time" (ID)). The questions relating to dreaming were not asked of every subject, since it was introduced after some spontaneous comments were made by some of the initial respondents. The results of the total analysis are given in Table 3.

Discussion

Mental Imagery in Student Group

The discussion begins with a description of mental imagery in the students. As expected mental imagery was a commonly experienced process and all students indicated strong visual imagery. They accurately described the magazine photos after they had been removed. All showed gross eye movements in relation to the pictures they were describing, and 25 percent showed gross motor movements (movement of head legs or arms) when describing what they had seen. Forty percent described colours spontaneously. All were able to see themselves in their mental image and were able to expand on the basic image in a variety of ways. Another response to the boating on the lake was: "Yes, you hear the noise of the boat rocking, just hit the sides, boats rocking and I'm grabbing the side." A number of the students, when describing the boating picture and attempting to visualize themselves in the boat, craned their heads forward, looked forward and concentrated, while describing what they were imaging. A

further response to imagining rowing the boat: "…felt sore, pretty exhausted. Feel a bit of pain in the back." They often elaborated in detail when asked whether they could put themselves in the imagined picture. This imagery covered many modalities including visual, auditory, kinesthetic sensations and sensory experiences such as hot and cold.

Occasionally individuals could not image actions and occasionally showed anxiety reactions. On occasion an individual would show surprise that they could image in another modality other than the visual channel. At the beginning of one session, an individual said they did not have auditory imagery, but towards the end of the session said with surprise, "I guess I can hear auditory images." All placed themselves in the image of the picture and viewed themselves carrying out actions (e.g., "I can see myself waiting for the camera to go off so staying there as long as I can – blowing out the candles." "I can see the cobwebs from the top of the ladder"). Sometimes an individual could not, or did not want to, imagine themselves in a particular mental picture (e.g., Following a request to imagine climbing the ladder: "No you can't do that. No. I don't like heights").

Although individuals found visual imagery a common experience, this was not always the case with other types of imagery. Auditory was only spontaneously experienced by 50 percent of the individuals and a further 40 percent when it was provoked by more direct questioning from the researcher. This was similar with tactile imagery. Kinesthetic imagery was directly reported by 30 percent, and taste was apparently experienced by 80 percent of individuals but only after direct questioning and promoting of gustatory types of experience. The following table provides some qualitative examples of these situations.

Table 5. Examples of types of imagery amongst the student group

A response to the fire in hearth: "Is the fire warm?" "It would be but I couldn't feel it." "Can't you feel it, the fire?" "No, No." "Are you surprised at that?" "Yeah, I am, because I am used to having an open fire and I know the sensation of open fires very well."

A response to garden and pool photo was: "Down beneath my feet it's a bit muddy and slidy." And when asked to place fingers in the pond said, "Water feels cold and moves around my fingers."

A response to the photo of a man blowing out candles on a cake was: "Yeah, I'm putting out the candles like that (uses his fingers to demonstrate), I smell the candles after they've been blown out."

Table 5.   (cont'd)

A response to woman by the stepladder: "I see myself at the top on the second to last ring." "Can you go right to the top?" "No. " "Why not?" "Because I had a bad experience when I came to the top of the ladder when I was younger." Another student said, "I can see cobwebs from the top of the ladder." A response to the picture with man and candles, which had not included children: "The kids, they want the cake and they are being noisy."

Overall the student group appears familiar with the experience of personal mental imagery and the students were able to manipulate their images. This was the case in terms of visual mental imagery, but the results show there were exceptions and some difficulties when dealing with other modalities. Many could manipulate the imagery, but restrictions were observed. The fact that some individuals showed surprise or initially doubted imagery in other than visual modality, only to spontaneously correct this during the sessions, raises questions about the degree to which some individuals in the group were aware of their imagery processes.

Mental Imagery in Individuals with Intellectual Disability

The data from the students provides a useful backdrop to understanding the performance of people with intellectual disability. While it is of interest that none of the students spoke aloud when viewing the photos, 50 percent of the individuals with intellectual disability described the photo content aloud. The accounts of mental imagery by participants with intellectual disability differ in level of verbal description. They were more concrete in description and appeared less familiar with the idea of mental imagery compared with the students, but there was a wide range of responses (see Table 3).

In terms of the photographs, some participants gave transitory accounts of possible imagery while others who gave clear accounts of imagery, described only static pictures. Eighty-seven percent of the individuals with intellectual disability were able to describe spontaneously some visual images after the photos were taken away. However, they showed much variation and the visual imagery only related to a few of the photos in a number of cases. Some descriptions suggested clear imagery by the individual – for example, "How do you know you can still see the picture?" "Because I think (points to her head), because you see the garden in your mind," whereas some individuals showed extreme difficulty in

recognizing any metal imagery. After some photo presentations a number of individuals appeared not to have or know they could have imagery.

For example, "Can you see it in your mind now?" "No I couldn't see it in my mind now." "Why is that?" "Because there is no picture to see." Several denied experiencing mental imagery; others reported they had visual images in some situations, and in particular circumstances such as in dreams. For example, "Do you often have pictures in your head?" "Not all the time. At night time." One individual indicated he used to have dreams and pictures, but no longer did so. Another individual indicated he could image the photos, but only if he shut his eyes.

Just as individuals often replied in concrete terms, as indicated above, they also sometimes showed this behaviour before the presentation of the photographs. In the pretesting of words (e.g., when asked to think of or imagine a chair), several individuals described the chair they were sitting on. One individual ran their hands over the chair while describing it. Another individual asked how he knew the "imagined" chair was blue, pointed to a chair in the room.

In response to specific questioning, and after the photos were removed, only 50 percent of the individuals elaborated on what they had seen, showing clear signs of imagery, (e.g., in relation to the picture of the tent). "How can you tell me all this (description of the scene)?" "Mind (points to his head), Yeah, you can see it (leans backwards and looks upwards)." "What else can you see?" "I see the tent." A response to picture of the garden follows. "How do you know?" "Because I think." "Can you see it now?" "Mmm, (nods yes)." "Tell me about it." "Ah! Nice garden. Walk around. Have a look." Table 6 provides further detail of imagery.

Table 6. Examples of imagery responses amongst persons with intellectual disability

Photo of tent: "You saw the picture. What was it?" "I know it's a tent, a man and boy. Back garden, tree, leaves." "Can you imagine someone else getting into the tent with you?" "May be a lady." "What do you hear?" "Talking. Mm, don't know what she is saying but she is talking. She is very kind." "What do you smell?" "Cooking. Barbecue things." "Can you see the flames?" "Yes, I can see the flames." "What do you feel?" "It's a bit hot." "Can you see someone else sitting with you?" "Yes, Margaret. She got one of the suits (deck of cards)."

Further comment from the same individual regarding photo of woman and stepladder: "Can you get the person to give you a cup of tea? Tell

Table 6.   (cont'd)

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me all you think of." "We're having coffee. She might offer me something to eat, biscuits, cakes. Tastes good, chocolate. I can smell it before I eat it. Good."

Photo of man blowing out birthday candles: "What can you see?" "A guy blowing out candles." "What colour are the candles?" "Red (this is correct)." "Can you put yourself in the picture?" "No, not at the moment, still blank."

Photo of the woman by the ladder, which is very static: "Can you make them talk in your picture?" "No I can't." "Can you try?" "I did but she won't answer." "Can you see the picture? Where is it?" "In my head, still drinking." "Can you get her to give you a cup of tea?" "She hasn't offered me one." "Can you make her offer you one?" "No, I can't." "What is the person doing now?" "Standing there." "Is she climbing the ladder?" "Not yet (correct)." "Can you make her do it?" "No. I can't." "Why not?" "Because she keeps saying 'no' to me." "Can you see her saying 'no'?" "Yes, I can hear it."

Photo of rowing a boat on a lake: "Have you got a picture of the boat in your head?" "Not yet...still blank." "I want you to see yourself by the water. What do you see?" "I see a bird flying over. Leaves a shadow."

Photo of garden with a pool: "Can you see the water in the garden?" "Yes drop… Water dropping (uses fingers and hands to illustrate)."

Occasionally imagery was only possible once external stimulation was reduced. For example, a response to man and candles: "Candles, birthday cake." "What can you see now?" "Three candles (looks upwards)." "You can see one now, can you?" "If you shut your eyes you can see your picture." One individual was asked whether he could see picture of the boat on the lake replied – "Yeah." "Who's in the boat?" "Two guys." "What are they doing?" "Catching fish." "Can you sit in the boat?" "No." "What happens when you try?" "No." In response to a picture of a chef cutting food when asked if they could put themselves into the picture, another individual replied – "No." "Why is that?" "Because I can't get into the picture." A further example involves the tent photo. "Can you tighten the (guy) rope" "Pull it, pull the rope?" "Can you see yourself doing that?" "No, you can't pull it… No, not there." "Can you make the boy get into the tent?" "No!" "Why not?" "Because he is not real."

Like the individuals in the student group, a few individuals with intellectual disability declined to image specific actions, either by saying they would rather not. For example, they did not wish to image climbing a stepladder.

"No, I can't. Because I can't. Because I am scared of heights." On one occasion a similar response came from an individual who did not wish to stand by the fire when asked to imagine this. They could image other aspects of the situation. Another individual described a photo once it was removed, but could not describe any actions or project herself into any of the images. "Can you imagine yourself cutting up the food?" "Yes. No, no, I'm not imagining now because there is no picture to see. No, I couldn't see it in my mind now." "Why is that?" "Because there is no picture to see."

Conclusion

It is apparent from the results that most individuals could report imagery. This included all from the student group and most of the respondents who had intellectual disability. This imagery was predominantly in the visual domain, but images relating to other modalities were reported in both groups. However, the reports were more frequent and varied amongst the individuals who were in the student group. External actions were reported in both groups and behaviour present in imagery was on occasion mimed. One man with Down syndrome responding to his recollection of the tent photograph, which included a father and son, went on to image himself in the picture and vividly acted kissing his girlfriend within the tent. The imagery when it occurred was usually idiosyncratic. Individuals, when manipulating their imagery, described specific items and this was possibly largely determined by experience, for example, people described chairs, which were in their home, camping trips they had been on, and so on. It is clear, though, that a portion of persons with intellectual disability could not consistently describe internal imagery. They answered questions but related them to external objects and events in the research room. They could sometimes name a friend but would deny they could imagine the friend – "He is not here so how can I."

Several individuals laughed aloud when asked to image ("see pictures") in their mind. In the case of those with intellectual disability this seemed to be associated with an inability to experience imagery. They were clear on the place of 'mind' and had appropriate words for describing its role in thinking.

Other individuals asked to image themselves in pictures, would sometimes act out the activity, (e.g., rowing a boat to shore and stepping out of it). Others, after being shown a picture of a woman doing limbo exercise, spontaneously noted stress in their back muscles and neck. Such description was more commonly reported by members of the student group, but was noted in some detail by more than one individual with Down syndrome. They could provide active descriptions of seeing their own movements and major
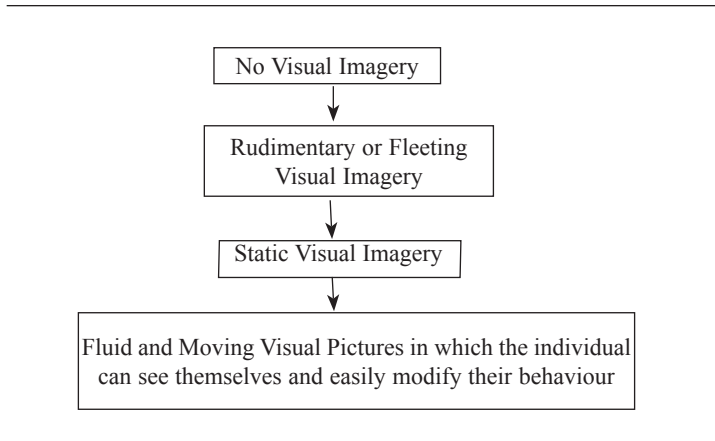
social interactions with individuals of their choice (e.g., going camping). In several of these instances the individuals were involved in drama groups and it is interesting to speculate the role this might play in developing imagery (see Warren, 1997). The following quote from "A Family Love Story" by the Magnus family (1995) concerning their adult son with Down syndrome who is a dancer, underlines this suggestion.

"One day I (Mother) prompted, 'Isn't it time you started dancing? You've been sitting there listening to your music a long time now.' He looked at me very seriously and said, 'Mom, I am watching myself do the dance'. Thus, I discovered Brad actively practiced visualization… This was not something he had been taught to do but which made a lot of sense to him. He found it and used it spontaneously" (pp. 167).

Further Discussion

This study is an exploratory one, but it does provide some interesting data concerning the mental imagery of people with and without intellectual disabilities. The results give rise to several possibilities, which need to be explored further with an expanded methodology. Although we cannot assume that individuals with intellectual disability have no awareness of imagery, their verbal reports suggest this may be the case at least sometimes. Some of the individuals immediately knew about their internal imagery and could describe it vividly, and our requests did not appear foreign or nonsensical to the students, although they occasionally indicated that no one had asked them about mental imagery before. However, a few individuals with intellectual disability appeared to find the idea of mental imagery strange to them. Occasionally they would laugh and indicate this was not possible. Although it can be argued that poor verbal comprehension may have played a role in the situation, it should be stressed that several individuals denied experiencing imagery while some other showed basic imagery but an inability to manipulate it. There were a few individuals in the group with intellectual disability, who apparently experienced no or limited visual imagery and several denied dreaming at night.

The results perhaps suggest there is a continuum of mental imagery, best or most easily described in terms of visualization, since this seems to be the most common and individually recognized imagery process. As a result of the above data and discussion we propose a mental imagery model along the following lines and suggest that the notion of this continuum might be investigated further.

Figure 1. Proposed visual imagery continuum

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                    │  No Visual Imagery  │
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                               ▼
              ┌──────────────────────────────────┐
              │   Rudimentary or Fleeting         │
              │        Visual Imagery             │
              └──────────────────────────────────┘
                               │
                               ▼
                ┌──────────────────────────────┐
                │   Static Visual Imagery       │
                └──────────────────────────────┘
                               │
                               ▼
   ┌───────────────────────────────────────────────────────┐
   │ Fluid and Moving Visual Pictures in which the individual│
   │  can see themselves and easily modify their behaviour   │
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The persons with intellectual disability seem to be found more often at the restricted end of the continuum. It is suggested that other modalities may follow a similar pattern. Imagery in these domains is also not so readily recognized by individuals, and is apparently expressed less frequently and amongst fewer individuals. We also suggest that imagery may be a developmental process dependant on experience. Like language it may develop first as an external, overt phenomenon, which becomes internalized as experience and learning take place. The external verbalization and references to external objects, as well as the motor behaviour, which was noted, seem consistent with such a view. At another level, using a parallel with the development of reading, it might be expected that producing and modeling events overtly may be a necessary precursor to the build up and internalization of imagery processes.

In another context Humphrey (1984) has argued that dreaming and visualization are means of learning and rehearsing for real life. The process has survival value and is particularly relevant to social learning. We suggest that this has been observed within this research. Sometimes the process is an inhibiting one. Some individuals said they could not visualize certain events because they were dangerous or anxiety provoking actions, (e.g., standing by a fire; yet doing so may also have benefits for comfort and social activity). We suggest that this limiting of perception represents an interesting version of Brown et al.'s (1992) argument that much rehabilitation is about keeping people quiet and non-active, which tends to limit the person's life

experiences and opportunity to try things out. Here we see examples where the visualization process reflects a method of inducing anxiety and promoting withdrawal from situations. This may have relevance to caring for individuals, but may also involve inappropriate inhibition of learning. In other instances, where the individual cannot mentally imagine a situation, social behaviour could well be affected. The question then arises – can such individuals develop mental imagery or an awareness of it through a learning process?

Overall the results indicate that we cannot assume mental imagery processes always occur or that some individuals are aware of imagery. Where the individual uses imagery it may represent an avenue for further learning particularly in social and allied areas. This needs to be explored. We suggest that imagery can serve as an anxiety inducer and a means by which societies, teachers and parents produce conformity, but because of the highly individual nature of imagery, it may also be employed to develop further learning and problem solving processes. Lack of, or lack of awareness of imagery, may limit learning in some instances. For example, a person with intellectual disability who cannot image the consequences of inappropriately touching someone of the opposite sex may be particularly vulnerable to society's criticism. Developing appropriate mental imagery may resolve this difficulty. This appears to be the situation in the example from Brown et al. given in the introduction. Again, someone who can image what they will be like in 10 years time is in a position to make plans. Other examples could be given. We do know that some persons with intellectual disability have difficulty in transferring to new situations, have difficulty in planning ahead, and in recognizing the consequences of specific behaviour, and developing mental imagery may play a useful role in such situations.

It seems logical to suggest that a wide range of events have to be experienced before visualization or other imagery can develop strongly. If this is the case any system, which minimizes normal environmental stimulation, will restrict the development of imagery. If the process is a critical one then it is (a) incumbent on us to explore it further; (b) observe in greater detail its occurrence and restrictions; and (c) observe and promote the development of imagery in persons who deny experience of the process or describe it in very limited terms. Its role in learning, including education, has yet to be explored in a detailed and consistent manner. Indeed the processes of imagery are not directly taught in most educational situations either for people with or those without intellectual disability.

Concluding Comment

The aim in the present study was to tentatively explore a potentially exciting frontier of perception and learning along with its possible implications for practice. The study represents an initial attempt to explore the nature of mental imagery and the extent to which different individuals use and manipulate imagery as part of their perceptions. It is necessary to develop and explore further more precise methodology, for there are many unanswered questions and some challenging possibilities.

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References

Andrews, F. M. (1974). Social indicators of perceived life quality. *Social Indicators Research, 1*, 279-299.

Brown, I., & Brown, R. I. (2002). *Quality of Life and Disability: An Approach for Community Practitioners*. London, UK: Jessica Kingsley.

Brown, R. I., Bayer, M. B. & Brown, P. M. (1992). *Empowerment and developmental handicaps: Choices and quality of life.* Toronto: Captus.

Brown, R. I., & Goldenberg, S. (1993). Imagery amongst persons with head injury: An unreported pilot study. Calgary: University of Calgary.

Cummins, R. (1997). Assessing quality of life. In Brown, R. I., (Ed.), *Quality of life for people with disabilities: Models, research and practice* (pp. 116-150). Cheltenham, UK: Stanley Thornes.

Courbois, Y. (1996). Evidence for visual imagery deficits in persons with mental retardation. *American Journal on Mental Retardation, 101*(2), 130-148.

Goode, D. (Ed.). (1994). *Quality of life for persons with disabilities: International perspectives and issues.* Cambridge, MA: Brookline Books Inc.

Graham, H. (1995). *Mental imagery in health care: An introduction to therapeutic practice.* London: Chapman and Hall.

Groden, J., Cautela, J. R., LeVasseur, P., Groden, G., & Bausman, M. (1991). *Imagery procedures for people with special needs. Breaking the barriers II video guide.* Illinois: Research Press.

Humphrey, N. (1984). *Consciousness regained: Chapters in the development of mind.* Oxford: Oxford University Press.

Schalock, R. L., Brown, I., Brown, R., Cummins, R. A., Felce, D., Matikka, L., Keith, K. D., & Parmenter, T. (2002). Conceptualization, measurement, and application of quality of life for persons with intellectual disabilities: Report of an international panel of experts. *Mental Retardation, 40*(6), 457-470.

The Magnus Family. (1995) *A human love story.* Saltspring, British Columbia, Canada: Alea Design and Print.

Warren, B. (1997). Change and necessity: Creative activity, well-being and the quality of life for persons with a disability. In Brown, R. I., (Ed.), *Quality of life for people with disabilities: Models research and practice* (pp. 270-291). Cheltenham: Stanley Thornes.

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