ORIGINAL RESEARCH PAPER

Linguistic

KEY WORDS: Flash Cards, Distance Perception, Depth Perception

DISTANCE PERCEPTION OF DIFFERENTLY SIZED FLASH CARDS: A STUDY OF THE EFFECT OF SIZE ON VISUAL PERCEPTION OF IMAGES

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ABSTRACT

Flash cards are important tool for those dealing with language, like Speech Language Pathologists, Linguists, Psychologists and Special Educators. There exist difference between the nature of use of flash cards among these professionals. When a flashcard has to be presented to a child who might be having any difficulty which may limit his identification of the card, such as Visual Impairment, Cognitive Impairment, Attention Deficit, Hyperactivity, Autism Spectrum Disorder etc, they should be of a minimum quality for ease of identification. One of these quality is size. As explained by the Size Distance Invariance, the perceived size of an object depends on the perceived distance and the perceived distance of an object may depend on its perceived size. Thus the present study compares four different sizes for the depth perception. It was observed that 45% of total participants preferred the most commonly used size for depth perception and 47.5% of participants preferred A5 size for fitting in the viewshed and creating a comfortable sight. It can be concluded that both these sizes are of choice by their users and 90% of the participants showed no perceptually significant difference between the two sizes. these sizes are of choice by their users and 90% of the participants showed no perceptually significant difference between the two sizes.

INTRODUCTION

Flashcards are a set of cards with a picture or word on one side and it's meaning in translation on the other (1). Flashcards may include word, phrase and sentences. Flash cards are used by many professionals like Teachers, Special Educators, Psychologists, Linguists, Speech Language Pathologist etc. A flashcard has many functions and is an important tool for eliciting speech sample in speech and language assessment. A Speech Language Pathologist (SLP) shows Flash Card to a child for various activities, like he might want the child just to pick the one which is being asked, out of many shown or he might want the child to tell what is there on it. In the former task the SLP wants the child to understand the spoken word, and then identify the card in front of him and show the one for the specific word spoken. While in the latter task the child has to understand the spoken question of "what is this?" and then identify the card and speak in word/phrase/sentence whatever is shown in it.

Thus Flash Card is an important tool for a Speech Language Pathologist as it helps probe in the receptive as well as expressive abilities of a child. A Flash Card is also an essential tool for a Speech Language Pathologist as it helps in assessment of both speech as well as language of a child. A Speech Language Pathologist uses a variety of Flash Cards to assess the level of morphology and semantics in a child and also to know which sounds a child is unable to speak /pronounce correctly. Flash cards are also used for the speech therapy of children with speech and language disorders.

A Linguist also develops Flash cards of various nouns, verbs, etc to elicit different languages and successfully perform language documentation of various languages. For example they show a card of knife to one community of a particular area to know if they have a word for it when another neighbouring community with different dialect or variety of same language may have different word for it.

In all the above uses of the flash card we observe that it is important that the flash card should be perceivable and identifiable as well as portable as one might need to carry it to places. For all professions other than Speech Language Pathology, psychology and Special Education, the flash cards are used with cognitively and linguistically normal population. Whereas the flashcard which a Speech Language Pathologist uses, is presented to a child who might be having any difficulty which may limit his identification of the card, such as Visual Impairment, Cognitive Impairment, Attention Deficit, Hyperactivity, Autism Spectrum Disorder etc. Therefore the flash cards need to have certain minimum quality for ease and comfort of perceiving and better identification. One of these qualities is the size of the flash card so that it properly fits in the central field of vision in both horizontal and vertical line of sight for human vision.

The viewshed can be determined by measuring the extent to which an object fills an observer's static field of view. The central field of vision for most people covers an angle between 50° to 60° for horizontal line of sight for human vision. Within this angle, both eyes observe an object simultaneously. This creates a central field of greater magnitude than that possible by each eye separately. A person's natural or normal line of sight is normally a 10°

cone of view below the horizontal while standing and, approximately 15° for vertical line of sight for human vision while sitting. This central field of vision is termed the 'binocular field' and within this field, images tend to be sharp; depth perception occurs and colour discrimination is possible. Developments, which take up less that 5% of the central binocular field, are usually insignificant in most landscapes (5% of 50° = 2.5°).(2)

Considering the above facts for human vision, we need to find out how the size of the flash card affects the identification of picture by comparing the depth perception and comfort in viewing (fitting in the viewshed). We would better use the flash card if it is of exact size for the central field of vision for human sight. This is also important for certain visual impairment like tunnel vision or low vision where an individual may face difficulty in capturing the whole image depending on its size.

AIM

The present study is designed to compare 4 different sizes of flash card for visual perception of distance and comfort of viewing.

METHOD

In Making of a Flash Card there are only 3 variables. First is the paper weight, second is paper size and third is picture or image on the flash card. In the present study the paper weight and image were kept constant and the paper size was exclusively varied. Therefore the paper weight was kept at 250 GSM (grams per square meter) and the images with good sharpness, resolution, colour acuity and contrast were selected and used in all the different sizes of flashcards, with size of image increasing proportionally with the size of flash card.

When considering the size of the flash card many commercially available flashcards comes in A5 or B7 sizes. For the present study the international standards for paper size, i.e., ISO 216 A series was

taken. ISO 216 defines the A series of paper sizes based on the principle that the height divided by the width of all formats is the square root of two (1.4142). The standardized height and width of the paper formats is a rounded number of millimetres. (5)

The sizes chosen were as follows:

S.No.	Size	Dimensions	Tolerance
1	A4	210 × 297	±2 mm for dimensions above 150 mm up to 600 mm ±1.5 mm for dimensions up to 150 mm
2	A5	148 × 210	
3	A6	105 × 148	
4	Popular Market size (M1)	142 × 210	

The 4 sizes of flash cards were compared for 2 features dependent on size, namely- comfort of viewing and depth/distance perception. Each participant was also asked whether they felt any difference between the A5 size and the M1 size. Participants had to mark the card for the best of each features. The data was collected from 10 special educator, 10 speech language pathologist, 10 linguists and 10 psychologists. The inclusion criteria was normal visual and cognitive ability and the exclusion criteria was any visual , psychiatric and cognitive abnormality. Subjects were randomly collected from workplace of their specialization, using snowball sampling.

RESULTS

The findings obtained for the size of the card that appears to be at the right distance is shown in the following Table 1. It can be observed that majority of special educators prefer M1 size to other sizes, whereas Psychologists prefer A5 and M1 sizes equally. Majority of linguists prefer A5 while the SLP's prefer M1.

Card Size	Special Educator	Psychologist	Linguist	Speech Language Pathologist
A6	10%	0	40%	10%
A5	10%	50%	60%	40%
M1	80%	50%	0	50%
A4	0	0	0	0

Table 1: Responses of participants to each card size for depth/ distance perception by 4 different group of professionals

The findings obtained for the comfort of viewing the card (fitting in the visual field) is shown in the following Table 2. It can be observed that majority of special educators prefer M1 size to other sizes, whereas Psychologists as well as Linguists preferred A5 and most of SLP's preferred M1. Smaller size was also voted by a few special educators and linguists.

Card Size	Special Educator	Psychologist	Linguist	Speech Language Pathologist
A6	20%	10%	20%	10%
A5	30%	60%	60%	40%
M1	50%	30%	20%	50%
A4	0	0	0	0

Table 2: Responses of participants to each card size for depth/ distance perception by 4 different group of professionals

Overall comparison of the cards sizes for depth/distance perception shows Majority of choices for M1 followed by A5 and for comfort of viewing (Fitting in the viewshed) shows majority of preferences for A5 (as shown in Figure 1). Most of the participants reported no significant difference between A5 and M1 sizes as shown in Figure 2.

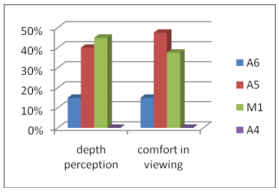

Figure 1: Overall response of participants for depth perception &comfort in viewing.

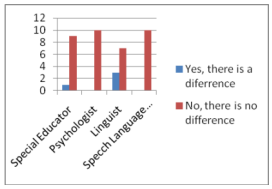

Figure 2: Findings on Perception of Size difference between A5 and M1

Larger size will occupy more visual field, even if the actual size of the object is unknown and if there is only one object visible, a smaller object seems further away than a large object that is presented at the same location (3). Therefore it is very important to have the right size of the card to facilitate visual focus on desired picture and its identification. In the present study, as shown in the figure 3, Special Educators and Speech Language Pathologists jointly voted for M1 while Psychologists have same opinion for A5 and M1both. Linguists voted in majority for A5 size but they also preferred A6. The most probable explanation behind it might be their nature of use of the cards. As Linguists usually carry cards to distant location, they prefer small size and they also do not deal with person with special needs therefore the distracters in the background of a small flash card does not concern them.

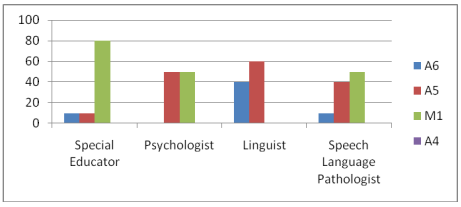

Figure 3: Responses of the participants for depth/distance perception of the 4 different sizes of flash cards.

Size and depth are intertwined and are explained by the Size Distance Invariance. Size Distance Invariance refers to the relation between perceived size and perceived distance. It simply states that the perceived size of an object depends on the perceived distance and the perceived distance of an object may depend on its perceived size. Therefore when the distance is kept constant, the different sizes of images create different visual angles on the observers retina, thereby altering the depth perception. An image that makes a greater angle appears to be closer while that making a smaller angle appears to be farther away , although the distance is same. This can be understood by the following figure 4.

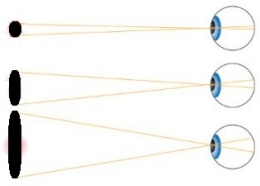

Figure 4: Effect of size on retinal Image

The size of image is also significant as when it fits in the viewshed it is perceived more precisely. The majority of Psychologists and Linguists preferred A5 size for comfortably fitting in the viewshed, thereby creating a comfortable sight/view. Whereas Special Educators and Speech Language Pathologists preferred M1 slightly more than A5 (as shown in Figure 5). However as most of the participants reported no significant difference between the A5 size and the M1 size, both the sizes fit well within the viewshed.

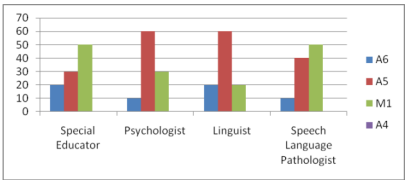

Figure 5: Responses of participants to each card size for fitting in the viewshed and creating a comfortable sight, by 4 different group of professionals

CONCLUSION

Flash Cards are an important tool for several professionals but still there is no common consensus on the size of flash card to be used. The size depth invariance explains the significance of size for perception of distance. As 45% of total participants preferred M1 for depth perception and 47.5% of participants preferred A5 for fitting in the viewshed and creating a comfortable sight, it can be concluded that both these sizes are of choice by their users and 90% of the participants showed no perceptually significant difference between the two sizes , both the sizes are suggested to be used in professions like Speech Language Pathology, Special Education and Psychology while linguist may use a smaller size owing to their purpose of use and the portability of cards.

References

1. Lado, R. (1964) Language Teaching: a Scient$c Approach. New York: McGraw-Hill.
2. Parameters of Human Vision and Viewshed Definition, Annexure A, Environmental Resources Management: Planning Application Report– Landscape & Visual Assessment, Australia (2009).
3. Sousa, R., Brenner, E., & Smeets, J. B. J. (2011). Judging an unfamiliar object's distance from its retinal image size. Journal of Vision, 11(9), 10, 1-6.
4. Sousa, R., Smeets, J. B. J., & Brenner, E. (2012). Does size matter? Perception, 41(12), 1532-1534.
5. Kuhn, M. (2016)International standard paper sizes, taken from http:// www.cl.cam.ac.uk/~mgk25/iso-paper.html