Simplicity is Not Always Best: Image Preferences in Patients with Mild Cognitive Impairment

Abstract

Mild cognitive impairment (MCI) is one of the most prevalent chronic diseases related to the decline of cognitive ability for elderly people. This decline in cognitive function could cause older adults to experience difficulty in interpreting the meanings of function icons on the interfaces of household appliances. The aim of this study was to explore the recognition of the meanings of different types of product function icons in individuals with MCI. These four common functions of images were redesigned according to two directions as test samples: from complex to simplified form and from plane to stereo form. In this study, 31 elderly people with MCI and their caregivers were invited to participate. The following test results were revealed: 1) Participants reported that stereoscopic images were more recognizable than flat images. 2) Images with more details were easier to recognize than those that were abstract. These results can be applied to the interface design of household appliances, which can also provide more data for designing product interfaces for elderly users and users with mild cognitive disorders.

Keywords : user interface design, image recognition, mild cognitive impairment, intuitive interaction

Image design

Wang & Chen
(2017)

This study further classified images based on the test conducted by Wang and Chen (2017) to understand the image characteristics of intuitive perception among individuals with MCI.

McCloud
(1993)

Horton
(1994)

Method

		Images number									
Sample functions		1	2	3	4	5	6	7	8	9	10
A	Electric fan function										
B	Security lock function										
C	Reservation function										
D	Stew function										

Results

Participants:

Participants in this study were 31 patients with MCI between the ages of 64 and 88 years (average age = 80.9 years; standard deviation (SD) = 6.04 years).

Rank

We used the Kendall's coefficient of concordance (W) to evaluate the ranking consistency of various sample images. Eight groups of images from plane to stereo are presented in Table 2. We assessed whether each group of images was consistently ranked. Ranking results from the first to the fifth were assigned 1, 2, 3, 4, and 5 points, respectively. The rankings for each group of images were consistent and significant.

Functions	Samples	Mean	Standard	Kendall's W	p
Electric fan	A1	3.71	1.395	0.146	0.001
	A2	2.77	1.477		
	A3	3.58	1.205		
	A4	2.48	1.151		
	A5	2.45	1.387		
Security lock	B1	4.00	1.571	0.180	0.000
	B2	3.35	0.950		
	B3	2.74	1.210		
	B4	2.52	1.235		
	B5	2.39	1.453		
Reservation	C1	4.06	1.315	0.216	0.000
	C2	3.06	1.209		
	C3	2.65	1.226		
	C4	3.16	1.157		
	C5	2.06	1.436		
Stew	D1	3.10	1.578	0.208	0.000
	D2	2.00	1.033		
	D3	4.00	1.125		
	D4	2.77	1.257		
	D5	3.13	1.335		

The results are as follows, in order from most recognized to least recognized:

Interview

The interview results revealed that the more simplified an image was, the lower was the degree of recognition. MCI patients also reported that realistic images were easier to recognize than oversimplified ones, particularly images with more details. Some caregivers also believed that MCI patients were unable to recognize oversimplified images because the shapes and lines were too simple, and that elderly individuals can more easily recognize realistic images. Oversimplified images require some time to recognize, whereas some familiar images are easier to understand.

Functions	Samples	Mean	Standard	Kendall's W	p
Electric fan	A6	1.71	0.938	0.590	0.000
	A7	1.97	0.948		
	A8	2.90	0.908		
	A9	3.87	0.806		
	A10	4.55	0.995		
Security lock	B6	1.71	1.346	0.600	0.000
	B7	1.97	0.706		
	B8	2.97	0.657		
	B9	3.68	0.791		
	B10	4.68	0.871		
Reservation	C6	1.58	1.119	0.697	0.000
	C7	2.00	0.577		
	C8	2.81	0.703		
	C9	3.81	0.654		
	C10	4.81	0.792		
Stew	D6	1.39	0.882	0.746	0.000
	D7	2.13	0.806		
	D8	2.74	0.514		
	D9	4.00	0.730		
	D10	4.74	0.631		

Conclusions

Suggestions

Prior experiences

People with MCI understood that image meanings were more dependent on intuition and prior life experiences.

Reducing cognitive differences

Consider the cognitive circumstances of elderly and general users to reduce cognitive differences in image understanding.

Complex images

MCI makes it easy to identify specific images and familiar images but difficult to understand images that are too simplistic. They prefer real objects and more stereo and complex images.

Easily identifiable elements

Prioritize the addition of easily identifiable elements to oversimplified image forms.