ABSTRACT: The aim of my research is to develop graphic tools for providing suitable information for young patients by using Affective Design; that is, design which involves people’s emotions, feelings or attitudes. In designing graphic tools the emotional impact of design on children should be considered. It is very important is to make young patients feel comfortable with the information they receive. Colour preference can be therefore one of the key issues. The study will use qualitative methodology to understand the needs of children by interviewing adults and children with a family history of cancer. This research will provide a possible basis for further investigation into the use of colour in designing graphic tools for children. This paper outlines a research methodology, and results from preliminary experiments described.

1. INTRODUCTION: Colour has a great impact on our lives, from early childhood onwards. Colour informs, evokes emotions, and affects our perception. Preferable colour can enhance cognitive processes [3] and therefore looking at colour preferences in children could give important guidelines for designing visual information about cancer risk. In designing graphic tool for patients colour can be a stress-reducing factor; moreover it can bring attention to important facts, and make information clear and comprehensive.

A number of studies have been conducted on colour-emotions associations [5, 10, 11, 12, 16], but not many concerning children [3, 4, 13]. Most researchers tend to agree that overall colours having maximum saturation and brightness are preferred and blue is most preferred among other hues [1, 9, 8].

1.2 COLOUR PREFERENCES IN CHILDREN Chung and colleagues conducted a study to analyse the preference colour tone of pre-school children. They stressed that previous studies on colour preference of children were limited in terms of the hue attribute and there is lack of studies of other attributes. The results of this study revealed that boys preferred vivid colours for yellow, red, and blue, and bright light tones for yellow, green, and purple. On the other hand girls preferred light tones for yellow, green, and purple and pale tones for red and blue [7].

Pitchford and Mullen showed that children prefer brown and grey colours less than basic colours [13, also 3]; moreover, these colour terms appear significantly less often in child-directed speech, which suggests that there is a link between the colour preference, linguistic input and colour cognition. Colours chosen in designing can affect perception and cognition and therefore can improve understanding and enhance learning process. Children are more likely to remember and recall information presented by using colours they respond positively to [3].
1.3 COLOUR PREFERRED BY PATIENTS. Fillingham carried out research on ‘best practice in design for patients’. He collected important data on perceived risk as well as participants’ personal preference of text or a graphic-based medium. The study showed that patients favoured lighter and brighter colours over darker colours, which often have negative associations. Therefore the author recommended use of these lighter colours within risk leaflets for positive associations. Furthermore colour data collected shows that light blue, pink and yellow were amongst the most popular/favourite colours chosen by participants [9].

In terms of an interior design interesting research was conducted by Coad and Coad. Their innovative project explored the views of children and young people, regarding their preference of thematic design and colour for their hospital environment in a new children’s unit. The novelty of the approach was that it was driven by the preferred choices of children and young people through the use of ‘child-friendly’ interviews and questionnaires. Three colour ranges were used to analyse data at both phases and were blue–green, red–pink–purple and orange–yellow spectrums. In general, the most preferred colours were the mid blue–green colours; however, some of the young people aged 11 years and above preferred the darkest range of blues and a range of mid, warm yellow-oranges, ‘bold’ pinks, silver and black. In the red–pink–purple colour range, only 18 (N = 18/180) participants showed a preference for mid red–pink–purple. Not all of the colours chosen were bright colours, as previous studies indicated [15], but rather pale to mid-colour ranges [6]. Interestingly colour preferences for objects and samples differ from interiors and surroundings.

2. EXPERIMENTAL METHOD: The participants were 20 children age 8-16 who have a family history of genetic cancer syndrome, and a control group of 20 children. Potential families were indentified via the Yorkshire Regional Genetic Service. The interviews were conducted at participants’ homes; to give children opportunity to feel comfortable during the interviews, in an environment they are familiar with. Some were interviewed at the hospital if they preferred it. Control group were conducted with children of different ages from local schools. Focus groups were interviewed at schools.

During the interviews children were asked how they feel about the information given by the professionals and preferred ways of informing them about the condition; which graphic formats, media they like. Each interview took approximately one hour. After answering the questions from the questionnaire prepared, children were asked to look at the colour boards, and place the emoticon’s stickers [Fig. 1] on the colour they think an emotion matches; every time using different board for each emotion. Time is not limited, and therefore one hour for an interview is just an estimated average time. There are 5 emoticons as a representation of the basic emotions which can be evoked by particular colours, described as happy, calm, dull, sad and angry. The children could also choose the colour they like most by using separate sticker. Introducing the emoticon stickers (icons) instead of descriptive or numerical method facilitate applying the emotions to colours and can help to make the experiment interactive and entertaining; moreover, it will allow observing child’s respond to affective design.
Figure 2 shows boards used for the survey, each of them consisted of 22 colours; 5 basic hues: yellow, red, blue, green, purple, 4 secondary hues, 9 less saturated equivalents of these and 4 additional colours: 3 achromatic white, black, grey, and brown. There were six boards (A3 format) with colour samples 3x3 cm each, randomly arranged on mid grey (18% reflectance) background. Samples were placed in a way which helps to avoid the rule of order. Colours were selected from a colour spectrum based on the HSB colour model which allows choosing the colour with the hue from 0° to 360°, with saturation and brightness value from 0%-100%. Brown and grey were chosen to find out if they are indeed less preferred colours, and also what is emotional impact of these.

Fig. 1 Stickers - emoticons used in the experiment.

Fig. 2 Colour samples used in the experiment.
2. HYPOTHESES
The following hypotheses are investigated to reveal colour preferences and emotional associations in children:

1. Hue has an effect on preferences. Blue is the most preferred hue.
2. Highly saturated, vivid colours are preferred by children.
3. Brown and grey are less favoured colours.
4. Dark colours like brown and black are more likely associated with sadness or despair [9]; light, bright colours like yellow, orange and pink have positive association.
5. Less saturated colours tend to have a calming effect.
6. Gender does not have an effect on colour preference.

The findings on the research hypotheses will help to design affective graphic tool and therefore help to provide appropriate and effective information about cancer syndromes for children and enable them making informed choices. Moreover collected data can be useful for future affective graphic tool development.

The research is on experimental phase (interviews ongoing) and the outcome will be analysed and published after essential data is collected.

Ethics
This research was approved by the National Research Ethics Committee (NHS, UK).

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