**Visual appeal, complexity and concreteness: Defining visual standards to manipulate icon characteristics**

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**INTRODUCTION**

Icons are everywhere!

1. Important design characteristics for icons: visual appeal, simplicity, concreteness (McDougall & Reppa, 2008; Reppa & McDougall, 2015).

2. Research in this domain requires experimental manipulation of these characteristics – however, no icon set is available in which these dimensions are manipulated in a controlled way.

3. Research question for this study: Is it possible to define design principles allowing for an independent manipulation of the three design characteristics: visual appeal, simplicity and concreteness?

4. Hypothesis: Complex icons are subjectively evaluated as more appealing – concrete – simple.

**METHOD**

1. Extensive design research based on existing icon sets.

2. Establishment of specific design principles.

3. Development of a new icon set (8 functions, 8 combinations of design characteristics).

4. Online-experiment.

Participants: N = 276 participants from the general population, aged M = 35.4, SD = 6.3, 81% female.

**RESULTS**

**Appeal Manipulation**

- Automated appealing icons, compared to aesthetically unappealing pleasing icons:
  - were rated higher with regard to perceived attractiveness (F(1,2206) = 30.73, p < .000, r = .12) Small effect
  - were rated higher with regard to perceived concreteness (F(1,2206) = 842.73, p < .000, r = .37) Medium effect
  - abstract icons were perceived as being more complex (F(1,2206) = 445.72, p < .000, r = .26) Small to medium effect
  - abstract icons were perceived as being more attractive (F(1,2206) = 297.77, p < .000, r = .34) Medium effect

**Complexity Manipulation**

- Complex icons: compared to simple icons:
  - were rated higher with regard to perceived concreteness (F(1,2206) = 445.72, p < .000, r = .26) Small to medium effect
  - were rated as being more abstract (F(1,2206) = 11.15, p < .001, r = .07) Small effect
  - simple icons were perceived as being more attractive (F(1,2206) = 307.72, p < .000, r = .32) Small effect

**Concreteness Manipulation**

- Concrete icons, compared to abstract icons:
  - were rated higher with regard to perceived concreteness (F(1,2206) = 445.72, p < .000, r = .26) Small effect
  - were rated higher with regard to perceived attractiveness (F(1,2206) = 13.03, p < .005, r = .06) Small effect
  - abstract icons were perceived as being more complex (F(1,2206) = 11.15, p < .001, r = .07) Small effect
  - abstract icons were perceived as being more attractive (F(1,2206) = 307.72, p < .000, r = .32) Small effect

**DISCUSSION**

What makes an artefact aesthetically pleasing? This question has been discussed for centuries (e.g. the Golden Ratio, Pythagoras, DaVid don Toilette). Leonardo da Vinci described this mathematical rule and it is still going on.

We have shown in this piece of research that there are specific design characteristics that make something aesthetically pleasing or displeasing, simple or complex and concrete or abstract. Furthermore, we have shown that it is possible to design icons with characteristics that differ independently.

These results lead us to the conclusion that new aesthetic models could be discussed and developed in a forthcoming study. That is to say, are aesthetics only based on form or also on function?