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

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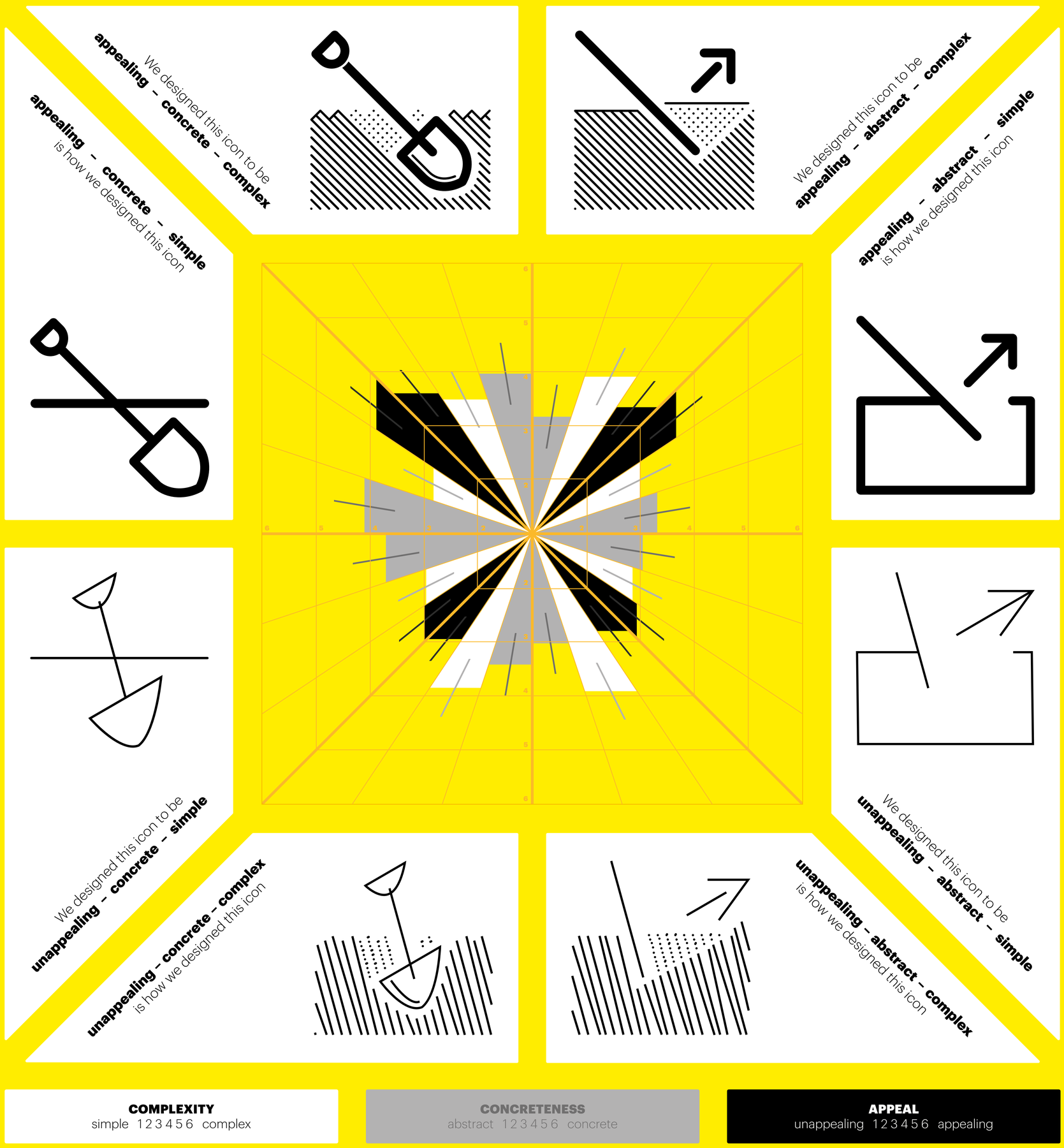


INTRODUCTION

1. Icons are everywhere!
2. Important design characteristics for icons: visual appeal, simplicity, concreteness (McDougall & Reppa, 2008; Reppa & McDougall, 2015).
3. Research in this domain requires experimental manipulation of these characteristics – however, no icon set is available in which those dimensions are manipulated in a controlled way.
4. 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?
5. Hypotheses: Complex icons are subjectively evaluated as more complex but this manipulation has no influence on ratings of appeal and concreteness (idem for visual appeal and concreteness manipulation)

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 = 26.14; SD = .63; 81% female

   Measures How complex is this icon?; How concrete is this icon?; How aesthetically appealing is this icon?; What does this icon mean?

   Procedure See icon, rate icon (concreteness, complexity, visual appeal), estimate icon-function (free text), see next icon (each participant saw each icon function once and each design characteristic combination once – Latin Square).

RESULTS

Appeal Manipulation
Aesthetically appealing icons, compared to aesthetically unappealing pleasing icons:

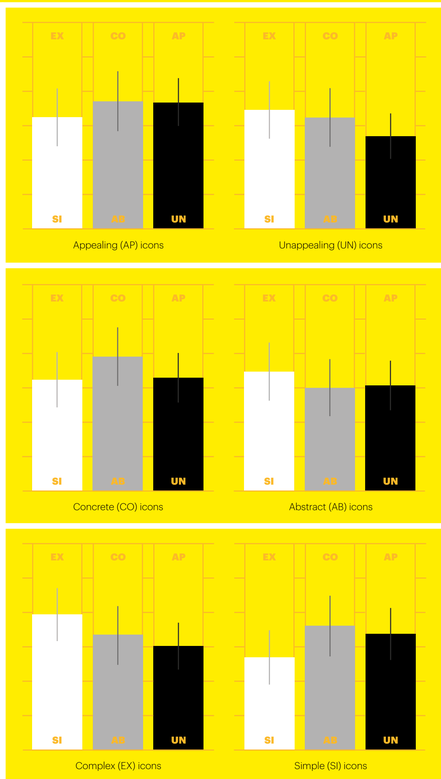
- were rated higher with regard to perceived attractiveness ($F(1,2206) = 297.77$, $p < .000$, $r = .34$) Medium effect
- were rated higher with regard to perceived concreteness ($F(1,2206) = 41.51$, $p < .000$, $r = .14$) Small effect
- icon aesthetics did not show an effect on perceived complexity ($F(1,2206) = 8.86$, $p < .01$, $r = .06$) 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 to medium effect
- were rated higher with regard to perceived attractiveness ($F(1,2206) = 13.50$, $p < .000$, $r = .08$) Small effect
- abstract icons were perceived as being more complex ($F(1,2206) = 11.13$, $p < .001$, $r = .07$) Small effect

Complexity Manipulation
Complex icons, compared to simple icons:

- were rated higher with regard to perceived complexity ($F(1,2206) = 842.73$, $p < .000$, $r = .37$) Medium effect
- were rated as being more abstract ($F(1,2206) = 11.81$, $p < .001$, $r = .07$) Small effect
- simple icons were perceived as being more attractive ($F(1,2206) = 30.73$, $p < .000$, $r = .12$) Small effect



DISCUSSION

What makes an artefact aesthetically pleasing? This question has been discussed for centuries (e.g. the Golden Ratio: Pythagoras, Euclid, Fibonacci, Leonardo of Pisa described this mathematical rule) and 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?

REFERENCES 5
McDougall, S. J., & Reppa, I. (2008). Why do I like it? The relationships between icon characteristics, user performance and aesthetic appeal. In *Proceedings of the Human Factors and Ergonomics Society Annual Meeting* (Vol. 52, pp. 1257–1261). SAGE Publications Sage CA: Los Angeles, CA.

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Annual Meeting of the Human Factors and Ergonomics Society Europe Chapter, September 28-30, 2017, Rome (Italy)