

# Understanding device stereotypes and their role in our interactions with everyday technologies

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## Background

In social psychology, a stereotype is a generalised expectation or belief that a person holds about another group of people [2]. These stereotypes are thought to serve as a cognitive 'shortcut', freeing up cognitive resource for other tasks [8]. Regardless of their accuracy, stereotypes shape a person's engagement with others; when a stereotype does not hold in a given scenario, cognitive responses can be impaired [4].

Despite their origins in social interaction, there is evidence that stereotypical beliefs can also be associated with objects [3, 5] and technology [6,7]. In this latter case, there is also growing evidence that some everyday devices, e.g. smartphones, are themselves social agents [1] -- if this is true, then it's very possible that cognitive tools used when engaging with others (e.g. stereotyping) are transferred to our engagements with devices.

In this PhD, I propose to explore the stereotypes individuals form for their everyday computing devices, the means by which they may be formed, and their potential role in shaping human-device interactions.

## Hypothesis and Research Questions

I plan to focus my research on four everyday computing devices: desktops, laptops, tablets and smartphones. These devices are highly prevalent in the UK, so it should not pose much challenge to recruit users to my studies. My research hypothesis is that: *our engagements with everyday computing devices lead us to form differing associations/stereotypes for each device type, and when engagements with these devices are incongruent with associated stereotypes, our interactions may be impaired.*

To explore this hypothesis, I propose to explore the following research questions:

RQ1: How are everyday computing devices used, and what associations or stereotypes do users hold for these devices?

RQ2: What effect do devices have on information processing? Does this effect differ for congruent/incongruent stimuli?

RQ3: What effect do devices have on recall (i.e. human memory)? Does this effect differ for congruent/incongruent stimuli?

RQ4: What are the implications for human-computer interaction (HCI) of any effects observed in response to RQ2/RQ3?

## **Proposed Methodology and Rough Timeline**

I am to complete my research within three years, followed by a short writing up period. My proposed activities are as follows:

- Year 1
  - Familiarise myself with the literature, with particular consideration for: (a) What do we know already about the distinct roles of different everyday computing devices? (b) What do we know already about associations made with those devices? (c) What prior applications (if any) have device associations had in HCI? As part of this activity, I also intend to validate my four chosen everyday devices.
  - Design and execute a large-scale (250+ adult respondents) online survey of UK device use. The survey will ask about devices used, the frequency and purpose with which they are used, and the associations users make with their devices.
- Year 2-3
  - Design and execute a lab-based study that measures the effect of device on response time (i.e. information processing) for both congruent and incongruent stimuli (i.e. stimuli that was established to be associated with the target device, and stimuli that was not). Use quantitative methods to analyse the data and establish if a statistically significant effect is observed.
  - Design and execute a lab study to measure the effect of device on recall, for both congruent and incongruent stimuli. Use quantitative methods to analyse the data and establish if a statistically significant effect is observed.
- Year 3
  - Based on the outcome of the two lab studies, explore potential implications for HCI. This may be purely theoretical (e.g. informed by the literature), or through a more applied study. The details of this final step will be determined in Year 2 based on preliminary analyses of study data.

## **Outcomes and Impact**

The final activity of my PhD is intended to ensure the applicability of any findings to HCI. Whilst the details cannot be determined ahead of time, some initial considerations include: e-

*learning* (can students study effectively on all devices?), *work-related stress* (is consuming work-related content, particularly out of the workplace, more detrimental on some devices than others?) and *media consumption* (do users engage differently with multimedia when watching on different devices?)

## References

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