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In my Visual System's Defense:
A (Cheeky) Letter to the Editors of JESP[*]

   The negative impact of smartphone use is a popular topic in social behavioral research: a query of "smartphone + negative" in Google Scholar returns ~27,000 articles written since 2014. Recently, the Journal of Experimental Social Psychology published several studies in this area, including a paper by Dwyer, Kushlev, & Dunn (2017), demonstrating that happiness and social cognition are damaged by individual smartphone use. The authors implore readers to save their relationships by putting down their phones. Our letter intends to show how the interaction of several established perceptual mechanisms with smartphone applications makes this action far easier recommended than achieved.

   Unlocking an iPhone is the very first requirement for its use, and doing so immediately lands users on the application homescreen (Figure 1). Apple has implemented designs that make this view irresistibly simple to interact with. Regardless of intent, users will notice the appearance of salient red notifications bubbles, which pop-out due to color, size, and shape differences from other screen elements (Wolfe, 1994). These bubbles act as "pull-cues" (Jonides, 1981), facilitating further attentional guidance to each associated application, and urge users to investigate emails, update applications, or tap the Extras folder. Although users can rearrange the order of application icons in this view, their relative spatial location and size is fixed. This clever UI constraint capitalizes on the visual system's rapid and effortless encoding of scene layout and structure (Tatler, 2002; Chong & Treisman, 2003). Thus, users quickly develop a reliable tapping pattern to hit/open applications through the non-attentive online stream of visuomotor guidance (Milner & Goodale, 1995). These simple cases illustrate how iPhone homescreen designs support hasty development of interactive habit and routines-- often largely in the absence of a user's perceptual awareness.

   The simple action of tapping a mail notification serves a vital purpose in the organizational lives of many professionals. In general, people can hold just 3-5 items in working memory (Luck & Vogel, 1997), which is often inadequate to memorize how many emails need attention. Fortunately, the mail application acts as an extension of visual memory (Rensink, 2008): providing a graphic representation of unread vs. read messages, which can even be flagged or sorted into folders. Users replace what would otherwise be a complex set of memory encodings (e.g., -reply to Sue, -read message from Bob, -delete my spam, etc.…) with one simple task, "-tap mail icon", and then respond according to what is displayed. Soft alerting (Rensink, 2011) for incoming messages prevents users from getting distracted while completing other tasks. Hence, smartphones increase and optimize cognitive capacity, forming new functional expectations for basic professional duties.

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[*] Written in accordance with the standards of the Journal of Experimental Social Psychology, accessed here: https://www.elsevier.com/journals/journal-of-experimental-social-psychology/0022-1031/guide-for-authors.

Smartphones help people work more efficiently; and when work is done, they can also help people relax. "Free-to-play" matching games (e.g., Figure 2) are a popular recreational pastime (Wikipedia). Here, players must locate and drag one candy to form a line of three or more of the same candies to earn points. Matching games use salient featural cues, like color and shape, which coerce attention toward singleton candies. Layering/transparency is also used to show which candies are "frozen", or not active in the game. This contrast facilitates configural focus for the user (Rensink, 2011), aiding their search for draggable candies and matches. The point rewards construct value-driven attentional capture (Anderson & Yantis, 2013) for candy matches, and ultimately reinforce high-level interest in gaming.

Smartphones are well-designed devices that encourage interactive habit formation by forcing quick and effortless visual processes. The rewards for attentional deployment are high: enhanced memory, increased work performance, and recreational leisure. In defense of the visual system, it won't be easy to put our phones away.
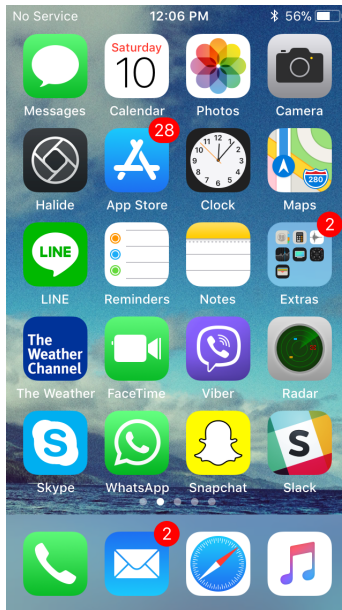
Figures

Figure 1. A typical iPhone homescreen with red notifications bubbles on the App Store, Mail application buttons and Extras folder button.

Figure 2. A typical "free-to-play" match-three game. Players must match three of the same objects to "break" the block and earn points. Yes, I am on level 1020.

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