

TOWARD STRESS-LESS USER INTERFACES

10 HEURISTICS BASED ON THE PSYCHOPHYSIOLOGY OF STRESS

Reveal Ability to Control Interruptions

Unpredictable interruptions compromise the control one has on focus.
E.g. Let the user specify, “Don’t show me this again.”

Reduce Feelings of Being Overwhelmed

Information overflow may make users feel they will not reach an end using an app.
E.g. A mobile Twitter client can default scroll to most recent tweets, not the feed’s oldest tweets.

Acknowledge Human Interpretation of Time

Humans don’t perceive time linearly; time is experienced slower the longer one waits [3].
E.g. Arrange longer processes to complete early on or distract users during waiting periods, particularly after they have already waited, with diverting interactions or stimuli.

Use Appropriate Tone and Emotion

Users engage computers with “overlearned social behaviors” such as politeness and reciprocity [6]. E.g. Use apologetic, funny, or polite requests when appropriate.

Provide Positive Feedback to User Input and Events

Negative feedback can threaten one’s self-esteem. Ex. Simplify tasks and acknowledge success.
E.g. “You successfully updated the application.”

Encourage Pro-Social Interaction

Social stressors include social evaluative threat. Encourage interactions that suggest validity.
E.g. Use “Likes”, “+1”, “Retweets”, and “Mentions” to express approval and validity.

Relieve Time Pressure

Users may feel a lack of control when they are pressured for time or even be worried about how they appear in a competitive sense. E.g. Minimize the number of ‘urgent’ time-dependent actions and countdowns.

Choose Naturally Calming Elements

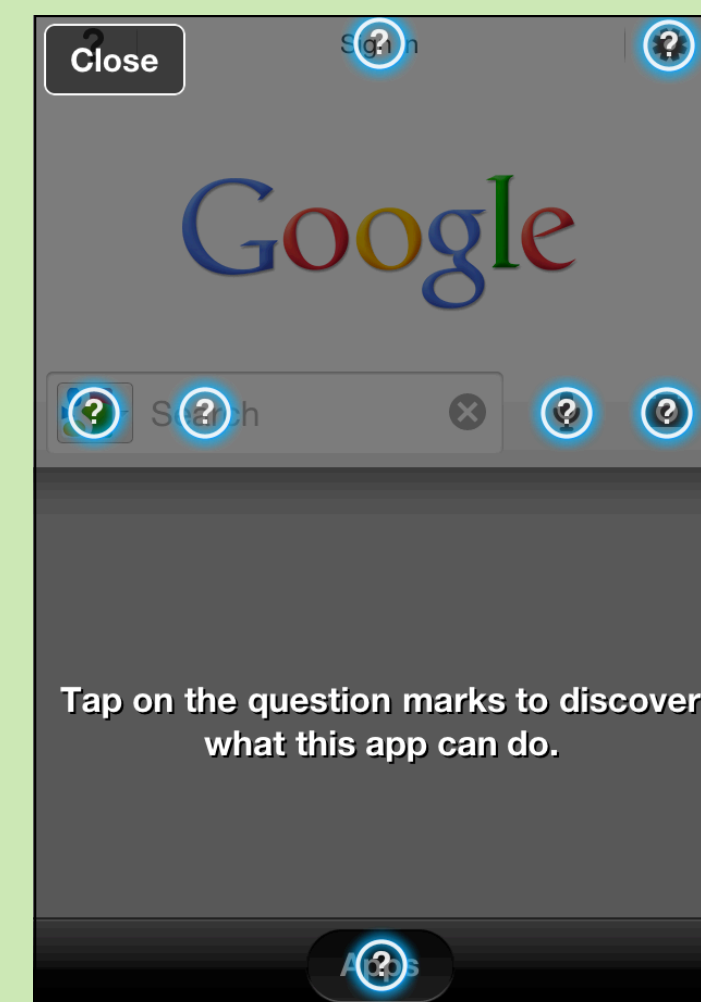
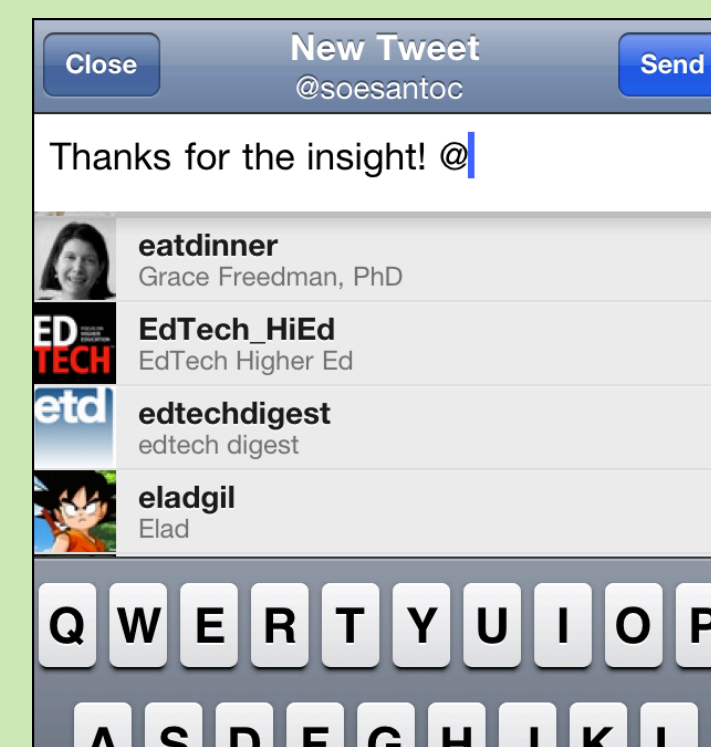
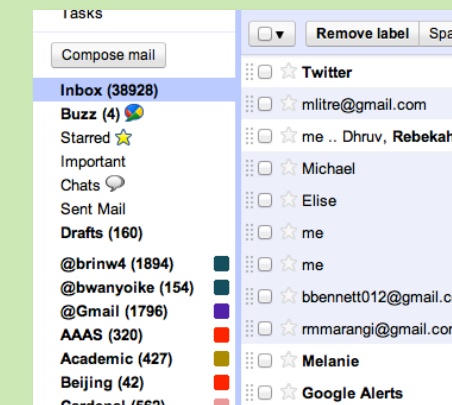
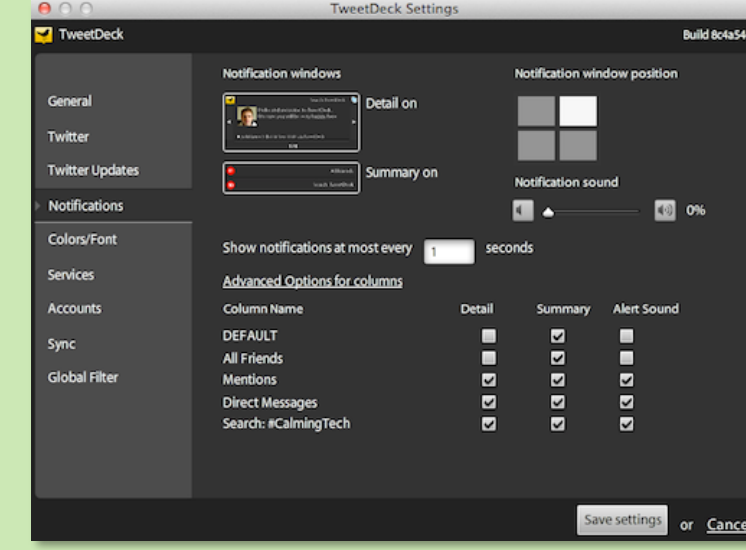
Involuntary attention at natural settings can encourage a positive emotional and physiological state [7].
E.g. Soothing error tones, naturalistic animations, and desktop wallpapers taken from the natural world

Acknowledge Reasonable User Actions

When a user expects to take an action that is not available, the stress response can be triggered and grow if not addressed, e.g. the system should acknowledge why certain buttons are disabled.

Demystify the Interface

Unsure of what the results of one’s actions will be, a user can feel stressed, e.g. tutorials and walk-throughs are more helpful than text tutorials; guide the user with small steps and examples to minimize unwanted actions.



why care about stress?

Stress accumulates over time and adversely affects brain functions, long-term recall, the cardiovascular system, and cognitive performance.

what actually causes stress?

Empirical studies have determined these stressor characteristics

has potential to cause harm or loss to one’s self or associated objects, living things, and property
feels unpredictable uncertain, uncertain, or unfamiliar in an undesirable situation
is perceived as judgment or social evaluative threat

evokes the perception of losing control

a stress-less heuristic evaluation

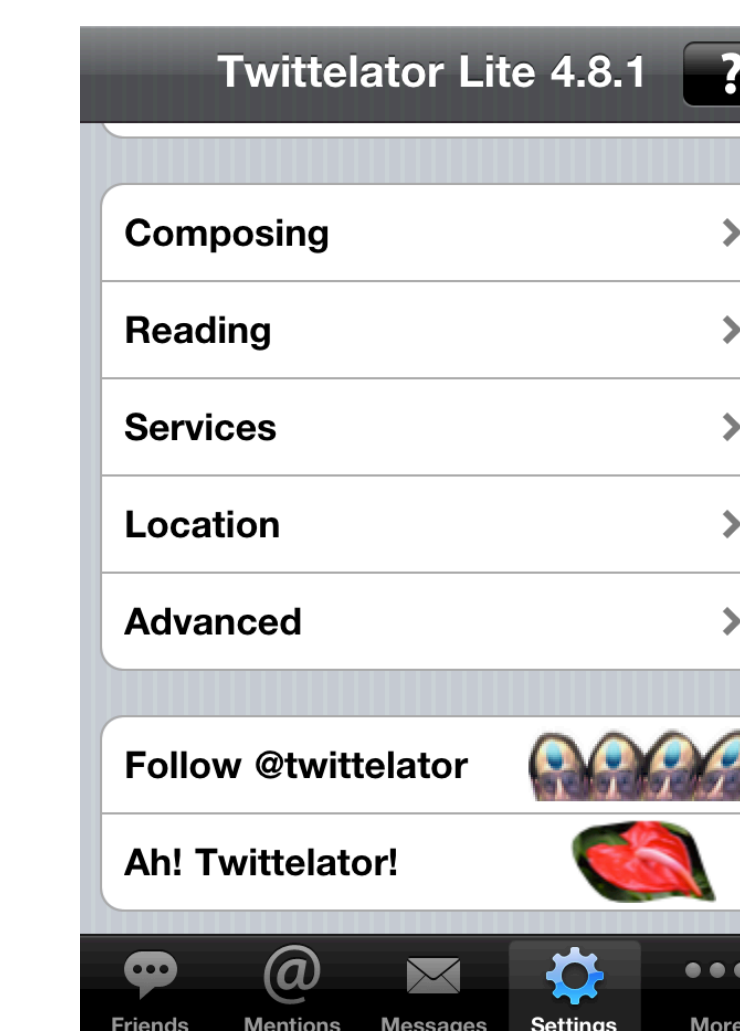
Twittelator

(U) unimplemented features
(S) natural, soothing sounds
(S) an interruption
preference section

NatsuLion

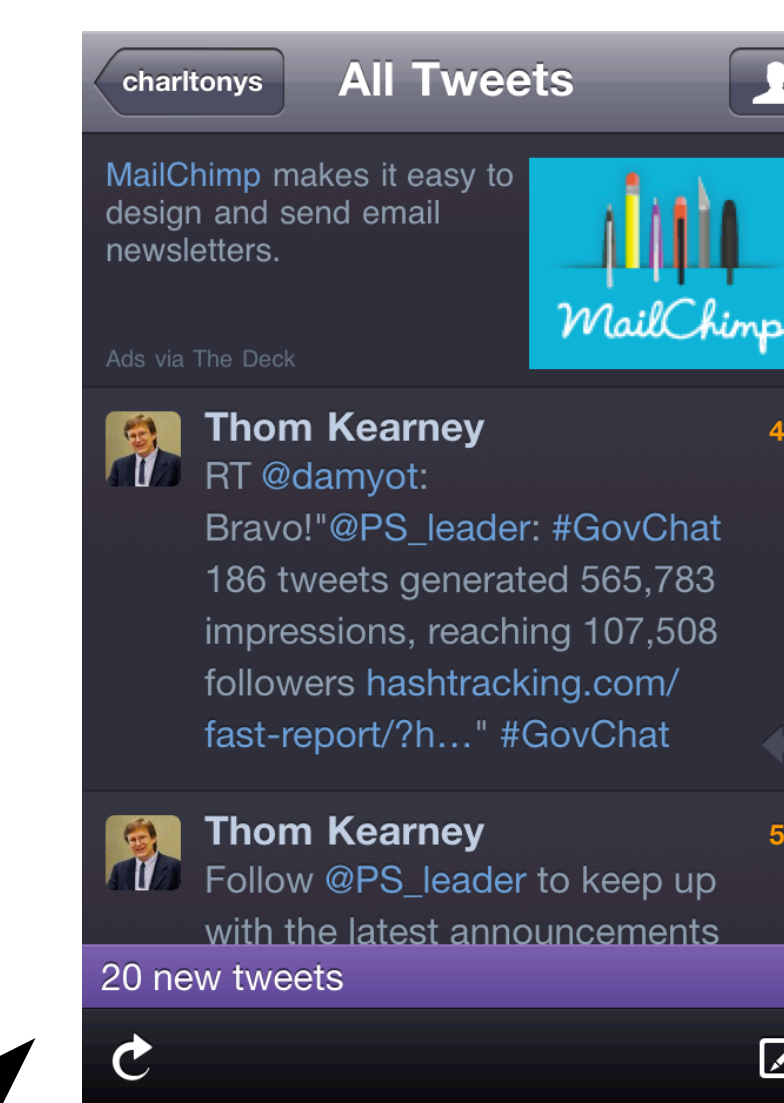
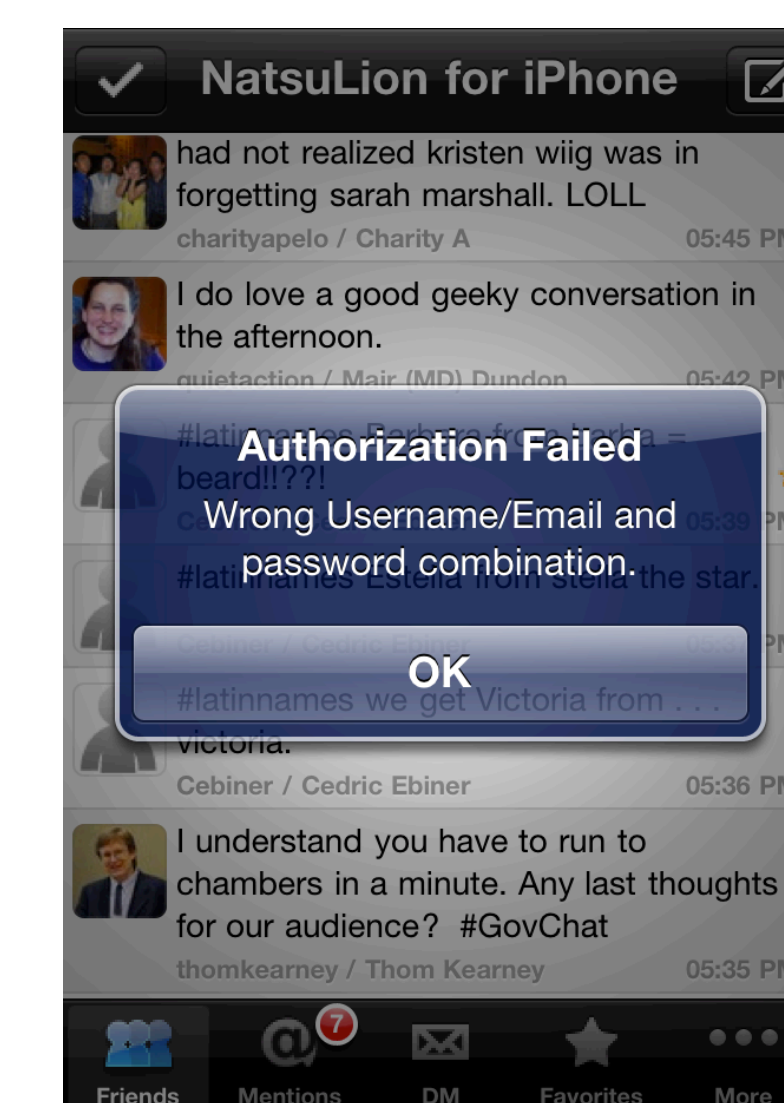
(U) inconsistent design
paradigm
(S) erratic “authorization failed” messages
(S) missing interruption
settings

FEWER POTENTIAL STRESSORS



LESS USABLE

MORE USABLE



MORE POTENTIAL STRESSORS

SimplyTweet

(U) a simple design
(S) humanized user
feedback prompts
(S) Info overflow prevention
with grouped tweets

Twitterrific

(U) minimalist design
(S) lacking info overflow
prevention

In addition to the stressor characteristics, biometric measurements such as heart rate variability or breath rate can measures stress levels while interacting with an interface.

future
work

Neema Moraveji, Charlton Soesanto
Calming Technology Lab, Stanford University



STANFORD
CALMING
TECHNOLOGY
LABORATORY

References: [1] Dickerson, S., Margaret, K. (2004). Acute Stressors and Cortisol Responses: A Theoretical Integration and Synthesis of Laboratory Research. *Psych. Bulletin*. [2] Dienstbier, R. A. (1989). Arousal and physiological toughness: Implications for mental and physical health. *Psychological Review*, 96, 84 -100. [3] Harrison, C., et al. (2007). Rethinking the Progress Bar. *Proc. of UIST*, Newport, RI. [4] Henry, J. P., & Grim, C. E. (1990). Psychosocial mechanisms of primary hypertension. *Journal of Hypertension*, 8, 783-793. [5] Lupien SJ, Maheu F, et al: The effects of stress and stress hormones on human cognition: Implications for the field of brain and cognition. *Brain Cognition*. Apr 25 [6] Nass, C., Steuer, J., Tauber, E. (1994). Computers are social actors. *ACM CHI*, Boston, MA. [7] Ulrich, R., et al. (1991). Stress recovery during exposure to natural and urban environments. *J. of Env. Psychology*.