# Using Micro-Waiting for Micro-Productivity

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## Biography

Carrie Cai is a PhD student in Computer Science at MIT, where she specializes in human-computer interaction. Her vision is to enable seamless micro-productivity and learning of desired habits, through designing systems that are flexible to the rhythm and activities of daily life.

## Abstract

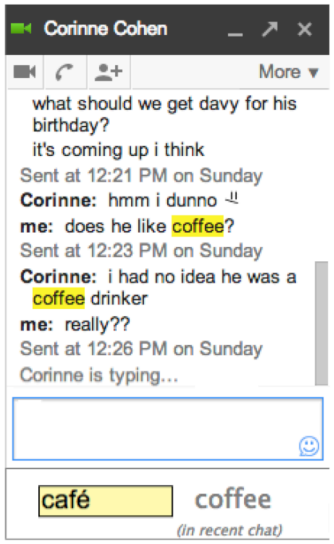
Although many people set out to accomplish long-term goals, such as learning a second language or exercising daily, these goals are often unfulfilled due to the busyness of daily life. My work explores ways to overcome the problem of limited time, by taking advantage of the existing micro-moments that we encounter regularly. In doing so, I tackle challenges such as identifying appropriate waiting moments for micro-productivity, designing interfaces that encourage engagement while minimizing intrusiveness, and determining how micro-tasks should be chained together to encourage continued productivity.

## Wait-Learning

Learning a habit requires regular practice, whether it's studying foreign language vocabulary, meditating daily, or exercising. Despite a perception of limited time, there are numerous micro-waiting moments throughout the day that are often spent unproductively, which could instead be used for micro-productivity and self-improvement.

The systems I have built for *wait-learning* [1] automatically detect when a user is waiting and encourage them to complete a micro-task during these fleeting moments. For example, *WaitChatter* [2] detects when a user is waiting for an instant message

**Example of Wait-learning**




**WaitChatter** delivers an optional foreign language exercise when it detects that the user is waiting for an IM reply.

reply and delivers a foreign language vocabulary exercise for the user to optionally complete while waiting. WaitChatter automatically identifies words in the conversation for vocabulary learning, and translates them on-the-fly into flashcard form. In an evaluation of WaitChatter, we found that Google Chat users spend ten to fifteen minutes a day waiting for chat replies, and that wait-learning is a viable method for learning vocabulary. On average, users learned four new words per day over the course of two weeks.

Beyond instant messaging, waiting also occurs in a multitude of other domains and situations. To address this, *Waitsuite* integrates wait-learning across diverse waiting moments, from the time spent waiting for an elevator, to the time spent waiting for email to load, or even the brief moment while wifi is connecting. We are investigating which factors make some kinds of waiting more appropriate for micro-tasking than others, and to what extent users encounter multiple kinds of waiting regularly.

## Microtask Chains

Chaining together microtasks can encourage the continuation of productivity beyond a single micro-task. For example, performing one microtask could help a person complete the next microtask faster, easier, or with higher quality. By decomposing large tasks into chains of more manageable, bite-sized chunks, greater goals could potentially be *self-sourced* [4] and completed during down time.

In our recent work [3], we found that core properties of a microtask (operation, content, and complexity) have significant effects on end-user experience, depending on how the microtasks are ordered. For example, we found that participants completed low-complexity microtasks faster when they were preceded by the same type of microtask, whereas they found high complexity microtasks less mentally demanding when preceded by microtasks on the same content. Some were also faster to start a complex microtask after first completing a simpler one. These findings provide insight into how transitions can be optimized from one microtask to the next.

## References


1. Cai, Carrie J. "Wait-learning: Leveraging Wait Time for Education." UIST Doctoral Symposium, 2015.
2. Carrie J. Cai, Philip J. Guo, James R. Glass, and Robert C. Miller. "Wait-Learning: Leveraging Wait Time for Second Language Education." CHI 2015.
3. Carrie J. Cai, Shamsi T. Iqbal, and Jaime Teevan. Chain reactions: The Impact of Order on Microtask Chains. CHI 2016.
4. Jaime Teevan, Daniel J. Liebling, and Walter S. Lasecki. "Selfsourcing Personal Tasks." CHI EA 2014.