Online and offline experiments on priming through a customizable free software application

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The "priming effect" has been previously demonstrated in many computer-assisted experiments with humans (De Houwer et al., 1998; Fazio, 2001). With the aim of continuing this line of research taking advantage of the Internet as a source of experimental subjects, we have developed a web-based application using standard technologies (XHTML, CSS, JavaScript) for online and offline experimentation. This application has been licensed as Free Software –GPLv3 (Smith, 2007)– and will be available for download at our research group website (www.labpsico.deusto.es).

Design Principles

Our application design is based on three basic principles: modularity, customization and standards compliance. Feature configuration is detached from application's code, hiding technical issues to researchers and providing a *"program once, experiment many"* approach. Experimental subjects are allowed to use any World Wide Web Consortium (W3C) standards compliant browser.

Software Architecture

A loosely coupled layer architecture allows concurrent work of researchers, developers and designers. The main advantage of our proposal is the capability of setting up different versions of priming experiments over the same application core with no effort. Furthermore, the application's performance can be improved without reprogramming it, updating used libraries (e.g. jQuery 1.4) or running on an optimized JavaScript engine (e.g. Google Chrome's V8). Appearance can be themed easily by a designer using Cascading Style Sheets (CSS).

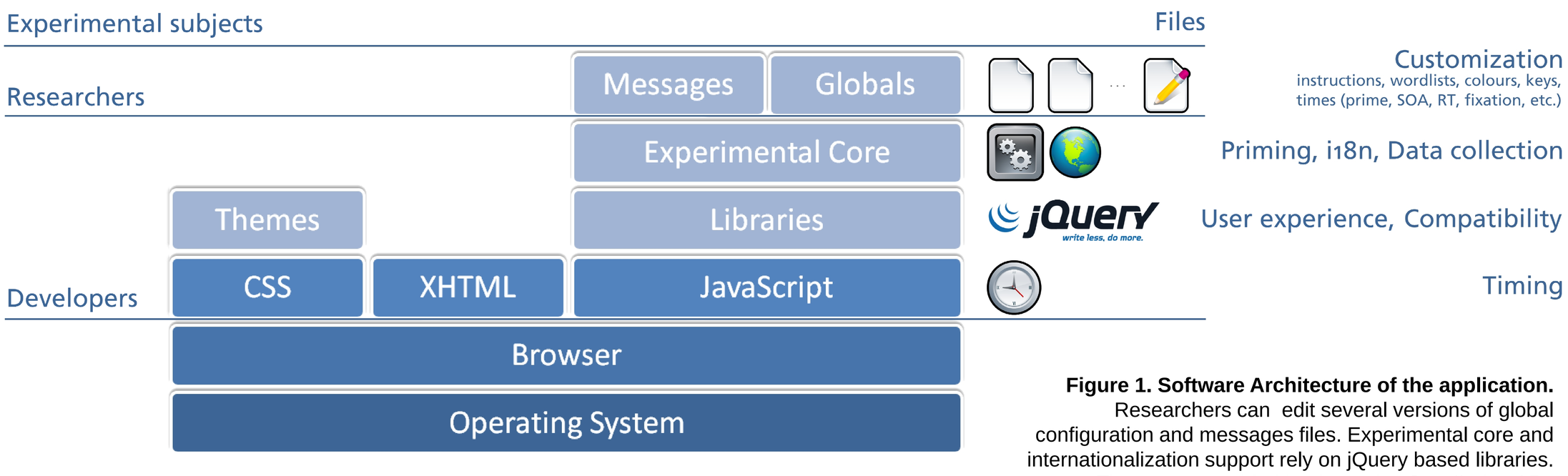

Figure 1. Software Architecture of the application. Researchers can edit several versions of global configuration and messages files. Experimental core and internationalization support rely on jQuery based libraries. Timers are provided by the native JavaScript API.

Results

Our application provides a lightweight and multiplatform solution for priming experimentation. As we can see in Figure 2, several browser/OS combinations have been proved with minor appearance differences and no functionality loss. Its performance and reliability is being tested in a running series of affective priming experiments with promising results.

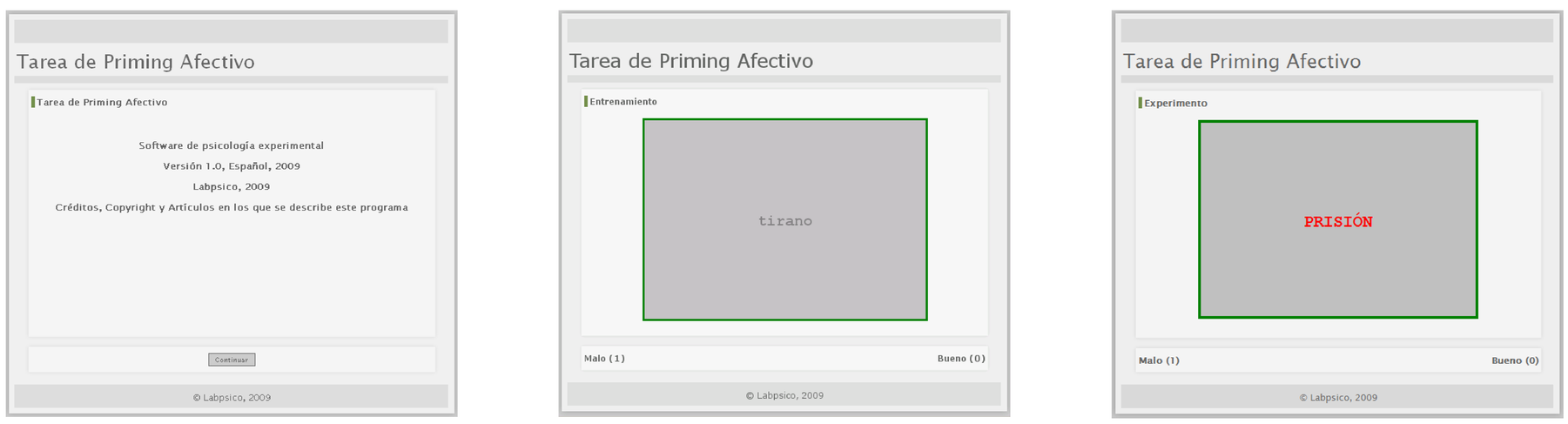

Figure 2. Screenshots of the application (v1.0). From the left to the right: A) Initial screen in Google Chrome on Windows XP. B) Prime exposure during test phase in Firefox 3.5 on Ubuntu 9.10, C) Response feedback during experimental phase in Internet Explorer 8 on Windows 7,

Discussion

Java or Flash have been preferred over JavaScript to measure reaction times (Eichstaedt, 2001; Reimers & Stewart, 2007), but recent studies (Galesic et al., 2007) confirm the reliability of the measurements obtained using JavaScript based experimental tasks for most of the cases. Another noticeable advantage of this approach is the ability to deploy identical offline and online versions, with very low computational requirements.

In addition, the license and standard-compliant nature of our solution enable the collaborative improvement of its main features by other research groups or third-party developers.

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