# Lab Protocol: Generating Non-English IATs and Collecting Offline Samples

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## Abstract

This protocol describes tools to: a) create non-English IATs using iatgen and R, b) build the repository of translations for iatgen, and c) deploy Qualtrics-based IATs in offline environments. Together, these functions increase the flexibility of the IAT and may help reduce the negative effects of WEIRD samples.


## Overview

This lab protocol includes tutorials for using new iatgen translation features and implementing IATs in offline environments. These features are independent, so researchers can leverage one or more functionalities depending on the study plan. Below we provide instructions for using iatgen's new features to generate IATs with non-English instructions, using either iatgen's official web interface or using the recently released tr.iatgen R package. Note that we explain how researchers can take advantage of the currently available vetted translations, and also how researchers can themselves translate iatgen's IAT instructions into other languages. Further, we also clarify the process researchers can follow to contribute their new translations to the iatgen translation project, in order to grow the number of languages supported. Finally, we describe a method for implementing Qualtrics-based IATs in offline environments.

# Tutorials

## Creating Non-English IATs using iatgen

Researchers can now create an IAT with instructions in languages other than English by choosing the language from a drop-down menu on iatgen.org. The language options listed in the iatgen web interface are vetted translations that produce a Qualtrics .qsf file with IAT instructions in the language of choice. There is also a repository of iatgen translations on GitHub (https://github.com/iatgen/iatgen-translations) that can be implemented with the tr.iatgen package in R or uploaded to the web-based shiny app to translate IAT instructions (note that users are responsible for checking the accuracy of unverified GitHub translations). Users can also create and implement their own translations, as well as submit new translations to GitHub to enhance the library of available languages for IAT research. After sufficient verification, translations submitted to GitHub will be added to the tr.iatgen package as well as the shiny app drop-down menu.

### *Web Interface – Using Vetted Translations*

The web-based shiny app is accessible at http://iatgen.org. Users should first fill in the appropriate fields to input IAT targets and attributes. Then, users can select a language for the IAT from the drop-down menu in the "Language" tab under "Advanced Settings". Iatgen will generate a QSF file with instructions in the chosen language. Several vetted translations are available on the iatgen web interface. Users wishing to translate the IAT into a language that has not yet been vetted can access additional, unvetted, translations on GitHub or create a new translation (both discussed below).

### *tr.iatgen Package in R – Using Vetted Translations*

To implement an IAT translation outside the web-based shiny app users should install the

tr.iatgen package in R, which can be done using the following R code:

```
devtools::install_github("iatgen/tr.iatgen")
```

This requires the devtools package which, in turn, can be installed with the command:

```
install.packages("devtools")
```

After installation, users can call the tr.iatgen::translate.qsf() function and set the chosen language in the dst_lang argument to translate an iatgen-generated IAT to another language. For example, to translate a standard IAT to Brazilian Portuguese users can run:[1]

```
tr.iatgen::translate.qsf(file = "/path/to/my_iatQSF", lang = "pt-br")
```

This function will return the path where the translated QSF can be found. The original QSF file will not be modified. If you wish to save the translated QSF file under a different name and / or directory, please set the dst_file argument, such as:

```
tr.iatgen::translate.qsf(file = "/path/to/my_iatQSF", lang = "pt-BR ", dst_file = "/path/to/my_differently_namedQSF")
```

For the list of available languages (i.e., those with vetted translations), please use:

```
tr.iatgen::available.languages()
```

Next, we turn to how users may use R or the web-interface to apply unvetted translations.

***Web & R – Converting an IAT to Another Language based on an Unvetted Translation***

All user-submitted translations – those that are vetted and those that still require verification – are available in a GitHub repository at https://github.com/iatgen/iatgen-translations/. Users are responsible for verifying the accuracy of unvetted translations. Feedback, in the form of corrections or verifications, is welcome (see the subsection Building the GitHub

[1] For users less proficient in R, we suggest the alternative `tr.iatgen::translate.qsf(file_= file.choose(), lang = "pt-br")` which allows the selection of the QSF file to translate through a graphical user interface.

Translation Repository below).

When using unvetted translations, users need two things: 1) a Qualtrics QSF file with the IAT to translate (e.g., an English IAT QSF obtained from the iatgen Shiny app) and 2) a translation file (here we assume the user has receive the unvetted translation from a third party, see the next section for how to create a translation file).

When using the web interface to apply an unvetted translation, users can simply upload the translation file to the "Language" tab under "Advanced Settings" of the iatgen shiny app to generate a QSF file, which will build the IAT when imported into Qualtrics.

When using R to apply an unvetted translation, users should first validate the translation file's integrity using the following function from the tr.iatgen package in R:

```
tr.iatgen::validate.language("my_new_translation.csv")
```

If validation of the translation file fails, users should verify the download and potentially submit a ticket on GitHub. Following successful validation, users should use the following command to translate the file:

```
tr.iatgen::translate.qsf(file = "my_surveyQSF", lang =
"fr", lang_file = "my_new_translation.csv")
```

This will generate a QSF file, which can then be imported to Qualtrics to build the IAT in that platform.

***Web & R – Creating a New Translation***

Users can use their own translations to create an IAT in a non-English language with the web interface or the tr.iatgen package in R. Users should first translate the original iatgen instructions by using the Excel template provided. The template can be found in the iatgen-translations GitHub, or web interface under the "Language" tab under "Advanced Settings," or through the tr.iatgen package. If using GitHub, users should navigate to the iatgen page

(https://github.com/iatgen/iatgen-translations/tree/main/templates) and download the template. If using the tr.iatgen package, users should execute the following function:

```
tr.iatgen::export.template()
```

This will return the path where the template file can be found.

The translation template has two columns – first the original English text which should not be modified and a second column for the translated text. Users should label the second column by selecting the appropriate language "subtag" from IANA Language Subtag Registry (https://www.iana.org/assignments/language-subtag-registry/language-subtag-registry). Examples of existing translations are available for reference at: https://github.com/iatgen/iatgen-translations/tree/main/templates. Importantly, the translation of each instruction must be placed in the same excel row as the original text. Further, it is critical that users not change the HTML tags (e.g., `<em>`, `<br>`, `<span>`) in the instructions to preserve the formatting of the IAT (e.g., "`original English instruction with <em>text in italic</em>`" should become "`translated instruction with <em>translation of text in italic</em>`").

Once the translation template is complete, users of the tr.iatgen package can validate the translation file integrity using the following function:

```
tr.iatgen::validate.language("my_new_translation.csv")
```

In case the validation fails, users may submit a ticket on the iatgen-translations GitHub asking for help. In case it is successful, the translation may be used to generate an IAT.

In the web interface users can upload the translation file to the "Language" tab under "Advanced Settings" of the iatgen Shiny app to generate the translated QSF file.

In R, users should set the lang argument in the `tr.iatgen::translate.qsf()`

function to the appropriate language abbreviation ("subtag"), corresponding to the heading of the second column in the translation template file. For instance, if one has a French translation of the IAT, then the second column of the translation template file should be labeled "fr". Then, users should set lang_file to point to the file's saved name, running:

```
tr.iatgen::translate.qsf(file = file.choose(), lang = "fr", lang_file = "iatgen_in_french.csv")
```

This will generate a dialog prompting the user to select a file. This should be the QSF file one wants to translate. After selection, R will use the translation file indicated in the lang_file argument (e.g., "iatget_in_french.csv") and the language in the lang argument (e.g., "fr") to translate the English IAT – in this case to French. The translated QSF can, then, be imported into Qualtrics to generate the translated IAT.

***Building the GitHub Translation Repository***

Users are encouraged to use GitHub's issue tracking or pull requests to submit new translations to the GitHub repository at https://github.com/iatgen/iatgen-translations/. New translations (in Excel template format) can be submitted either as a pull request or by attaching the file to a GitHub issue submission. Importantly, users can also review and help verify the accuracy of submitted translations. Once a translation has been reviewed and endorsed by at least three independent researchers in GitHub, it will be added to the web-based iatgen shiny app. To verify a translation, contributors can submit an issue about the translation to GitHub. Issue details should include the contributor's contact info and professional affiliation.

***Example R Script with Documentation***

Merging all the previous R examples above into a single script and adding some explanatory comments, we get the following R code:

```
# Install devtools
install.packages("devtools")

# Install tr.iatgen package
devtools::install_github("iatgen/tr.iatgen")

# List available languages
tr.iatgen::available.languages()

# Translate an IAT to European Portuguese by specifying file
path.
tr.iatgen::translate.qsf(file = "/path/to/my_iatQSF", lang = "pt-
pt")

# Translate an IAT to European Portuguese and specify where to
save the output file.
tr.iatgen::translate.qsf(file = "/path/to/my_iatQSF", lang = "pt-
pt", dst_file = "/path/to/my_translated_iatQSF")

# Start web interface for iatgen translation
tr.iatgen::runApp()

# Validate the translation file format
tr.iatgen::validate.language("iat_inst.csv")
```

```
# Translate a standard IAT to French, assuming the 2nd column is
labeled "fr" (for French translation) in iat_inst.csv.
tr.iatgen::translate.qsf(file = file.choose(), lang = "fr",
          lang_file = "iat_inst.csv")
```

**Using iatgen Offline**

There are many reasons researchers may wish to – or need to – conduct IATs offline. For instance, economists and sociologists may wish to study rural livelihood in developing countries, where unstable internet connections make online IATs impossible. Or psychologists may wish to study attitudes about social justice among inmates in prison, where internet connectivity is limited. In such circumstances, it may be necessary to have offline capability. As long as a physical keyboard is used to collect participant reaction times, latency measures are valid (see Lowes et al., 2015, for an example of an IAT conducted without an internet connection). Hence, iatgen can be used without an internet connection, allowing IAT research to occur even in offline locations, helping scholars reach less WEIRD samples.

Using iatgen in offline environments requires access to offline survey functionality in Qualtrics. When conducting IATs with images, some additional fine-tuning is also necessary. These steps are detailed below.

***Obtaining access to offline surveys with Qualtrics***

Standard Qualtrics does not function offline. Researchers who wish to conduct offline surveys must establish a contract with Qualtrics to access offline functionality.[2] Note that while offline apps are available for Windows, iOS, and Android, the QSF file generated by iatgen is

[2] Support for setting up offline App for Qualtrics can be found here: https://www.qualtrics.com/support/survey-platform/distributions-module/mobile-distributions/offline-app/setting-up-the-offline-app/

known to work only with iOS. For researchers who want to use iatgen offline without images, this is the only necessary step to conduct offline IATs.

***Fine-tuning iatgen for Offline Studies (When using Images)***

Researchers who wish to use iatgen offline with images should complete the following steps. In an offline environment, the Qualtrics app cannot access the server, and thus iatgen is unable to display server hosted images as it usually does when online. Therefore, instead of uploading images to the Qualtrics server and specifying image locations via URL, researchers working in an offline environment should convert images to Base64 and directly embed the Base64 text.[3] Converting images into Base64 string might result in a long text string that – unless broken apart – could exceed the limit of a single line in the R console (or RStudio). Hence we suggest either breaking image strings or – more conveniently – running the resulting QSF generation script using the "source()" command in R (note: this means clicking the "source" button to run the script in R Studio).

***Downloading and Conducting IATs Offline***

In order to conduct an IAT study offline the study should first be designed and published online in Qualtrics. Then, researchers should download it to the offline Qualtrics app while connected to the internet. Running the offline IAT is otherwise the same as in online environments. Whenever the survey device is connected to the internet, researchers can upload collected data to the Qualtrics server. Due to this feature, multiple devices can be used to survey numerous respondents simultaneously, and survey responses can be consolidated once all devices are connected to the internet.

[3] One can convert images to Base64 using various free online software.

## Expected Results

This protocol essentially provides an overview of instructions for using the translation features recently added to iatgen. The expected result of following any of the first three tutorials (*Web Interface – Using Vetted Translations, tr.iatgen Package in R – Using Vetted Translations* and *Web & R – Converting an IAT to Another Language based on an Unvetted Translation*) is a QSF file which can be imported into Qualtrics to create an IAT with the IAT instructions in the desired language. The "*Web & R – Creating a New Translation*" tutorial provides the necessary steps for translating iatgen's IAT instructions while preserving their graphical layout (e.g., keeping bold and italic text rendering as such). Importantly, the resulting spreadsheet file is expected to be compatible with both iatgen's web app and the tr.iatgen package. Researchers who follow the "*Building the GitHub Translation Repository*" will gain access to the source files with the existing translations and learn how to submit a new translation.

In turn, following the "*Obtaining access to offline surveys with Qualtrics*" is expected to enable the option for researchers to run Qualtrics surveys offline. Likewise, going through the steps outlined in the "*Fine-tuning iatgen for Offline Studies (When using Images)*" results in a QSF optimized for offline data collection. Please note that following that tutorial is only necessary if an IAT study runs with images offline, if an IAT study runs with images online or runs offline but with no image stimuli, there is no need to follow the steps outlined in that tutorial. Finally, the last tutorial, "*Downloading and Conducting IATs Offline*" outlines the few steps required to run an offline IAT data collection study (with or without image stimuli) with iatgen+Qualtrics' mobile app.