Chronojump Manual

(updated until Chronojump 0.9.2 version)

http://www.chronojump.org

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Part I

Obtaining and configuring the software and the hardware

Chapter 2

Obtaining the software and the hardware

To use Chronojump technology is necessary:

Detection device one or two contact platforms or photocells.

Chronopic (chronometric device responsible to receive the changes in the detection device)

Chronojump management software.

Computer with Windows or Linux operating system connected to chronometer Chronopic and executing the software Chronojump.

2.1   Chronojump software installation

Chronojump is free software which works with Windows and Linux operating systems. To be download at the web page `http://www.chronojump.org/software.html`.

For more information consult the frequent questions of the software (FAQ) `http://www.chronojump.org/faq_software.html`.

2.2   Acquisition and construction of the detection device

If you like to buy measuring device please check online shop at the web page `http://www.chronojump.org/hardware_store.html`

To build your own contact platform or photoelectric cell, consult at the hardware section at the web page `http://www.chronojump.org/documents_es.html`

2.3   Acquisition and construction of the Chronopic chronometer

If you like to buy the Chronopic chronometer, please check online shop at the web page: `http://www.chronojump.org/hardware_store.html`

If you want to build your own Chronopic please check the section Hardware at the web page: `http://www.chronojump.org/documents.html`

For more information consult the frequent questions of the software (FAQ) `http://www.chronojump.org/faq_hardware.html`

Chapter 3

Configuring Chronopic

Chronopic is an integrated circuit used by Chronojump to detect the test done at the detection device. To obtain the Chronopic please check section 2.3.

For more information about Chronopic consult the web page: `http://www.chronojump.org/documents.html`

Current Chronopic version is Chronopic3 (fig 3.1).

3.1   Chronopic connections

Chronopic 3 is a USB powered hardware. Using USB cable it receives data from PC and also power. To complete the connection, this cable will also be connected to the socket.

All Chonopics will be connected to the platform using the terminal block. This terminal block will receive each of the two cables from the contacts platform. Chronopic3 adds an RCA jack, to be used by the terminal block, RCA, or both.

Using fuse (and / or Chronopic3 RCA) it is possible to connect 'n' networking platforms to any Chronopic. This model is useful to chronometer situations where an athlete should not be able to be in more than one platform at the same time. Both cables of each platform must be connected to the terminal block provided so the two wires of each are in a different terminal block contact.

Software allows the connection up to 4 Chronopics with an independent signal, each connected to one or more sensing devices. This makes possible chronometer independently various subjects, complex paces or other applications.

3.2   Chronopic working process

Chronopic detect changes in the contact platform and sends it to the computer by USB cable, USB-serial or serials. You can also use the test button to simulate changes in the platform.

Chronopic has a light to indicate when the subject is on the platform (light stays on) or outside the platform (light is off).

3.3   USB ports

The operating system assigns names to ports, as shown in Table 3.1.
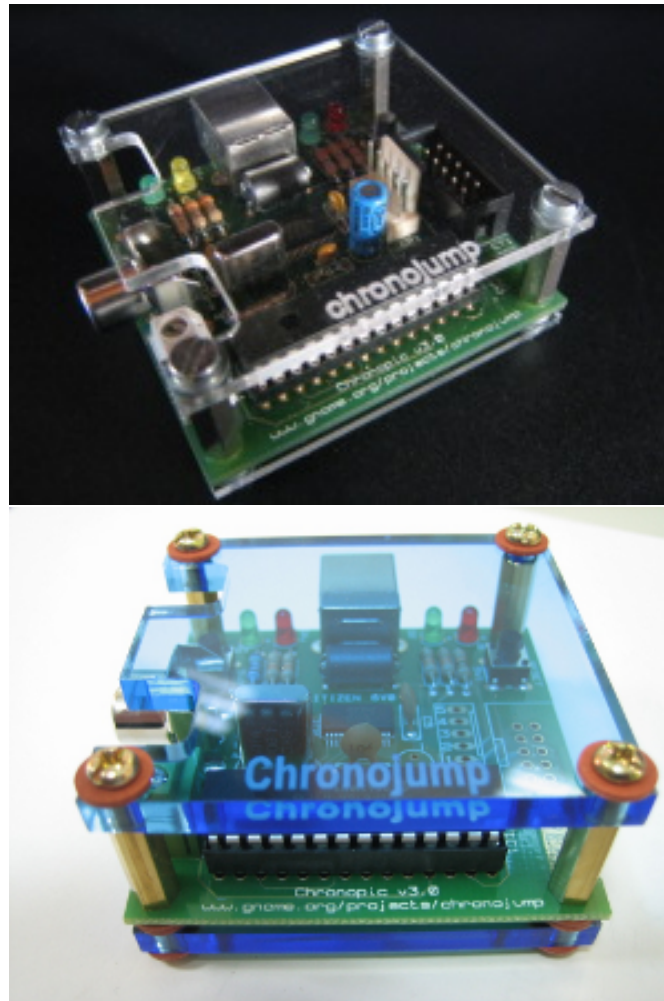
Figure 3.1: Chronopic3.
The image above shows the 200 initial units. The methacrylate was available in different colors such as yellow, orange, blue or transparent. The image bellow shows the second process of the assembly with 500 equal units.

Operating system	Port	Name	Comments
MS Windows	USB	COM1, COM2, COM3, ... (seen to COM27)	Driver required
GNU/Linux	USB	**/dev/ttyUSB0**, /dev/ttyUSB1	

Table 3.1: Names of each operating system port.
The most common names are in bold type text.

The use of the driver is explained in the next section.

3.3.1 Windows USB Driver

A driver is a small program that indicates the computer how to operate a new device.

Chronopic3 plate requires a driver to run on Windows. This driver is automatically installed when you install any version later than Chronojump 0.7.

If you connect the Chronopic to the computer, and it's detected "New hardware found", then the driver is not required, in other case it will be necessary to run the driver.

3.4 Detection port

As explained in section A.3, is assigned a port name for the connection. In case of using **Linux**, the port name is not usually a problem, because the names are clear and the / dev/ttyUSB0 is usually correct.

In case of using **MS Windows**, when Chronopic3 is connected to the USB port, the driver assigns different names: COM1 ... COM27 or higher. In previous versions of Windows Chronojump, the port was auto detected, but later version than 0.6, this is not possible. In case of port serial, is typically assigned port COM1.

We recommend the following process when the port is detected in Windows because of the connection of Chronopic via USB:

1. On the desktop or the Start menu, **right click** on the icon "My Computer" Right (In Windows Vista the icon called "System")

2. On the menu select "Properties" (last item)

3. Go to the tab "Hardware"

4. Select "Device Manager"

5. Click the '+' which is to the left of "Ports COM & LPT"

6. Will the port be indicated as COM? to the right of "USB-serial" click the right mouse button and select "Properties" if this doesn't appear, then we can see the COM port assigned.

7. The value of COM, such as "COM3" is what we have to enter in the configuration of Chronopic.

The port can change in a reboot or after plugging new USB devices.

The antivirus Spy-doctor has been related to problems in ports connection `http://mail.gnome.org/archives/chronojump-list/2008-January/msg00012.html`. We recommend to stop it.

3.5   Modification port assigned by Windows

If the port assigned is COM5 or higher it may cause problems in some computers detection. If this happen, it's recommended to assign a lower port than COM5, preferably COM1 or COM2.

To manually assign a port, repeat the steps described in 3.4 to know which port is assigned, then do the following steps:

1. Click "Port Settings".

2. Click on "Advanced Options".

3. Select one of the ports COM1-4 (preferably COM1 or COM2).

4. Accept and close the assistant.

5. Disconnect the USB cable and reconnect it after a few seconds.

At this point it should be assigned a COM port that device that will last forever. Alternatively, return to perform the steps described in 3.4 to verify that the change was made directly.

En este momento ya debería tener el puerto COM asignado para siempre a dicho dispositivo. Opcionalmente, si quiere puede comprobar que el cambio se ha realizado directamente puede volver a realizar los pasos descritos en 3.4.

3.6   Chronopic solution problems

In case of detection failure when changing Chronojump platform, we propose the following battery of tests. If Chronopic is not working after performing these tests, please noted at the Forum `http://foro.chronojump.org`.

Perform each of the tests until it's working correctly. Remember to check that the cables are connected properly.

1. Power Problem: The light will turn on when you connect the USB cable (this will happen when the computer is turned on, when there is a connected platform and someone stepping on it, or pushing the test button).

2. Problem networking platform: Connect the contact platform (without computer) and check the Chronopic by clicking on the platform and checking if the light turns on and off. If the light doesn't turn on and off, but it did in the previous step, then the cables are in touch when they are connected to Chronopic. Insulate them, check if they are poorly connected or if the platform has a bad contact (disassemble and repair).

3. Port problem on Windows: If the contact platform doesn't have any problem, unplug it and continue the testing only with the Chronopic. Then, check if the port is detected and connect the cables to the computer, the power should also be detected in the Chronopic as described in Section 3.4. Windows may detect more than one type of port COM, do the following test to both. If the port assigned is higher than COM4, it's recommended to modify the port to one less than COM4, preferably COM1 or COM2 as described in Section 3.5.

4. Execute Chronojump, type the port configuration in the Chronopic window. A dialog will appear asking you to click "OK" and after this click on the button Chronopic, shortly Chronopic should be detected and ready to be used with the platform connected if desired.

Part II

Using Chronojump

Chapter 4

Using Chronojump

4.1 IMPORTANT, READ FIRST

Chronojump 0.9.3 has changed massively the graphical interface. Unfortunately, this manual is not updated to that change.

All you can find in the current Chronojump Manual is useful because you will know what you can do, but lots of the things are done now differently.

As Chronojump 0.9.3 is lot easier, we hope you can find the way to do what you want.

Manual will be updated in the future.

Also note lots of the images are from the spanish version.

Sorry for the inconvenience.

4.2   Chronojump main window

Figure 4.1 shows Chronojump main window. This is divided into the following parts:

The menu where you find the access to most of the functionalities.

Edit subject provides a quick access to individual operations.

Subject selection where you can select the subject and edit it with the menu that appears when you click on the right button of the mouse.

Chart selected test If there is a drawing of the test selected or targeted by the mouse, it will be shown. Also, if the program has expanded information on the test, displays an icon to indicate it. By pressing this button it will display a help window on this test chart containing the expanded and test information.

Tabs that allow you to change the work form, actually: Jump, Simple Jump, Run, Run in sections, reaction time, pulse and multi Chronopic.

Doing tests with the functionality of executing each of the tests on the tab or active labor module.

Viewing and editing the tests shows different selectors for viewing and editing the jumps and runs. User Notification displays information about the last action.

Sound Turn off or on.

4.3   Chronojump Menu

In the following pictures you can see the drop down menu of the program.

Session Menu see figure 4.2.

Person Menu see figure 4.3.

Jump Menu see figures 4.4 and 4.5.

Run Menu see figures 4.6 and **??**.

Other tests Menu see figure 4.8.

Tools Menu see figure 4.9.

Help Menu see figure 4.10.

4.4   Chronopic/s Connection.

Is possible to connect one or more Chronopics on the menu: *Tools / Chronopic*. In Figure 4.11 two Chronopics connected are shown. There is a help button for the ports by clicking on the *Help* button window. The connection to the Chronopic timer is specifically addressed in section 3.

If the first Chronopic is activated, the first circle will be green. You can connect more than one to perform tests in Multi Chronopic. When you select the port, you must click on the right button to make the connection. In each successful activation the red circles will become green.
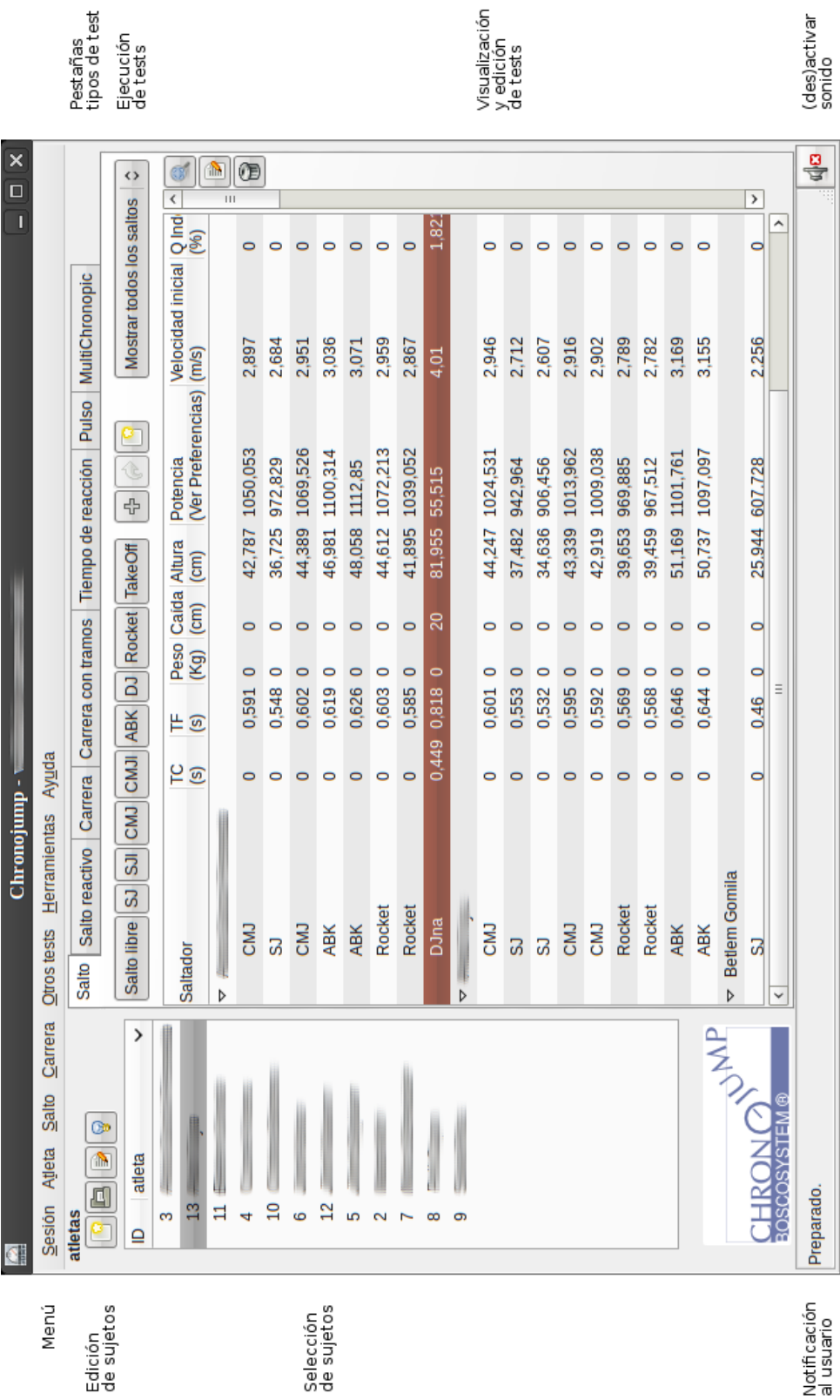
Figure 4.1: Chronojump main window.
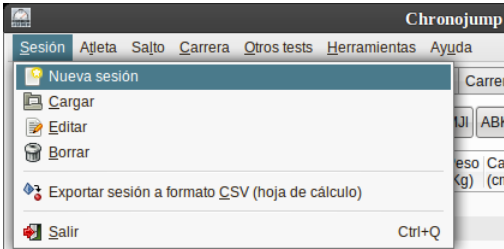
Figure 4.2: Session Menu.
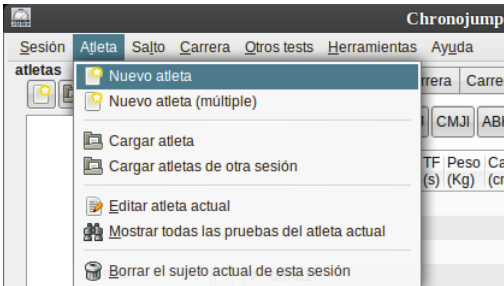
Figure 4.3: Person menu
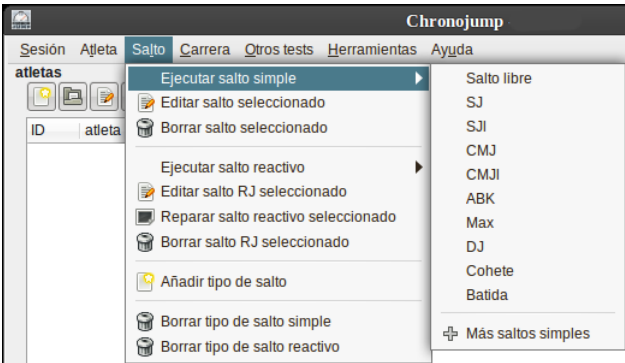
Figure 4.4: Jump menu with simple jumps.
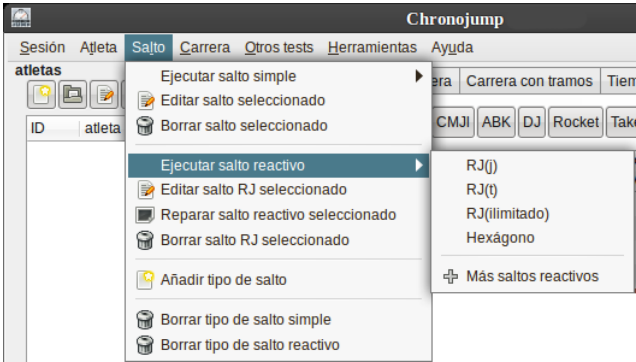
Figure 4.5: Jump menu with reactive jumps.
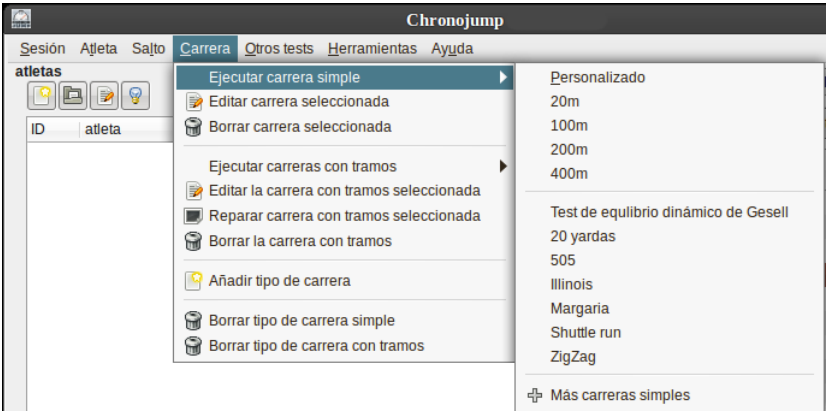
Figure 4.6: Run menu with simple running.

Figure 4.7: Run menu with intervallic running.
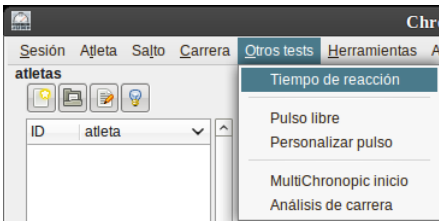
Figure 4.8: Other test menu.
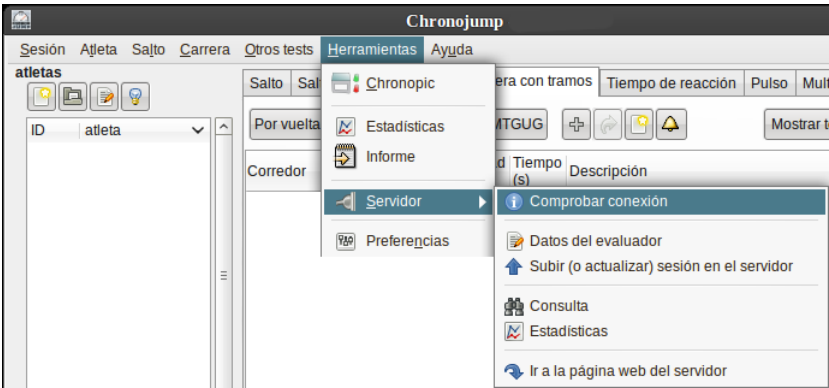
Figure 4.9: Tools Menu.

4.5 Database: sessions, subjects and tests

Chronojump stores all data in one database file. Thus, instead of collecting the information in individual files for each session, all information is organized in a single file to facilitate the study of relationships between:

- sessions

- persons

- tests (jumping, running, reaction times, pulses (rates), multi Chronopic)

All modifications in session, subjects and tests, will be updated at any time in the database. So there isn't need to save the information periodically and make data loss to a computer error. If rare case, the program crash, you wouldn't lose any data except sometimes the one that is being performed at the time.

4.5.1 Sessions

The sessions represent situations where the coach or evaluator gathers many athletes (subjects) for a series of tests. Every time you gather a group of athletes to be tested in a short space of time (usually one day), you should create a new session. Although the subjects to assess are the same as in other session, you should create a new one to keep adding subjects and tests in an old session. In this way, you can make comparisons between data.

Figures 4.12 and 4.13 demonstrate the creation of a session.

4.5.1.1 Creation

Click on the menu *Session menu / Create session* and one window will be opened where you must enter the name of the session, the date and the sport practiced. Optionally you can also indicate the place where is done and even add comments.

4.5.1.2 Load

If you want to load a session already created to study, add subjects and / or to test, click on the *Session menu / Load session*. It will show a list of sessions created and information of the subjects enrolled in each of them and the tests performed.

4.5.1.3 Edición

Click on *Session menu / Edit session* to modify the parameters that have been inserted earlier. Normally, it's used the edition of sessions to add comments about the evolution.

4.5.1.4 Delete

To delete a **session and all tests** performed, click on the *Session menu / Remove session*. A confirmation window will appear.
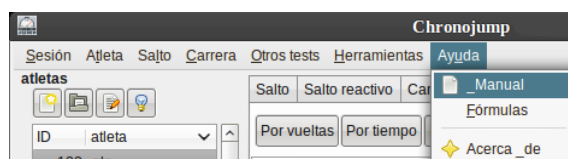
Figure 4.10: Help Menu.
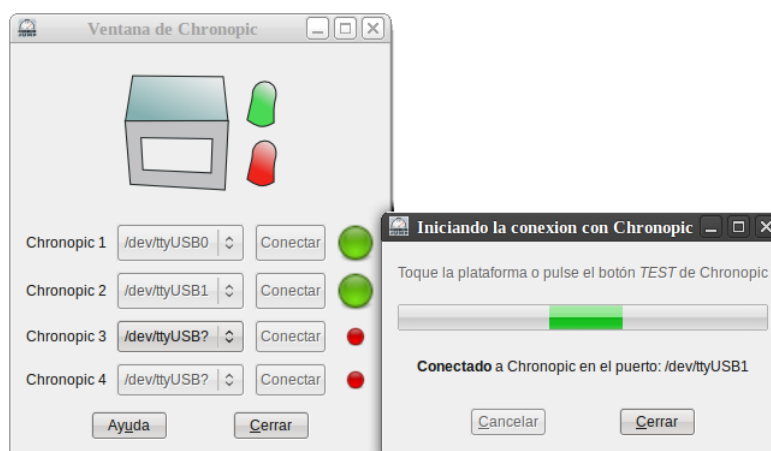
Figure 4.11: Chronopic connection.
The figure corresponds to the program Chronojump-in version for Linux operating system, which are connected with two Chronopics.
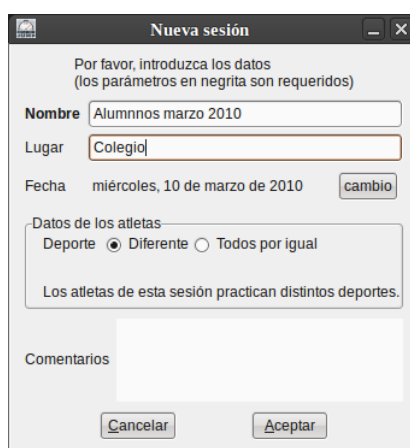
Figure 4.12: Nueva Session. School students.

4.5.2   Persons

All individuals able to perform the tests are known as subject. It's strongly recommended to create one subject only once in order to study the evolution over time. In following sessions the subject must be loaded.

Figure 4.14 shows the creation of a person.

4.5.2.1   Current person

The subject on the left side of the main window is known as *current person*. All tests done shall be linked to that subject. The latter subject created or loaded is assigned as current person.

Tests shall not start until the current person is assigned.

4.5.2.2   Creation

Click on the *Person menu / Create person* or use the Create button to create a person. You may indicate the full name, gender, date of birth, height, weight, country, sport, mode and level. It's important to enter the full name to avoid further conflicts with other different persons.

In order to accelerate the creation of multiple persons, click on the menu *Subject / Create persons [multiple]*. A window will appear where you can create multiple subjects at once. Once created, if you still want to create more persons, you can click again on the same menu item. Figure **??** shows the creation of 11 persons at once.

4.5.2.3   Load

If a person has participated in another session, and you want to evaluate him/her again in the current session, click on *Load person*, and enter the same subject to the new session. The program will distinguish between tests (jump, run, reaction times and rhythms) made by the same person in two or more sessions.

If you created a session and you want to continue with the same person/s in another session click *Load persons from another session* and check all persons who participated in the other session or multiple session. If you wish you can always discard any subject.

Figures 4.16 and 4.17 show the load of subjects.

4.5.2.4   View subject tests

Click *Show all tests of current person* to see all the tests that this person has done in the different sessions. You can also select other persons of the current session.

4.5.2.5   Edit

Click *Edit person* or press *p* (person) to modify the data that was entered at the same time as the creation. You can also add comments.

Figure 4.13: New Session. Rhythmic competitors.

Figure 4.14: Creation of a person.
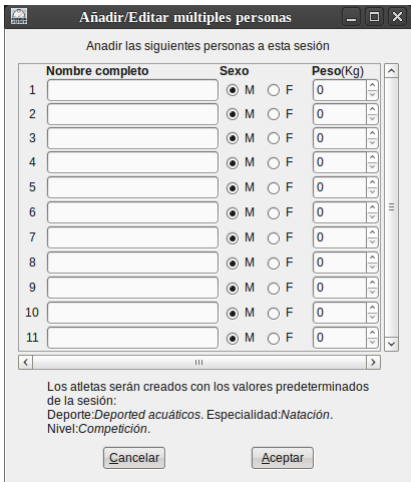
Figure 4.15: Creation of different persons simultaneously.
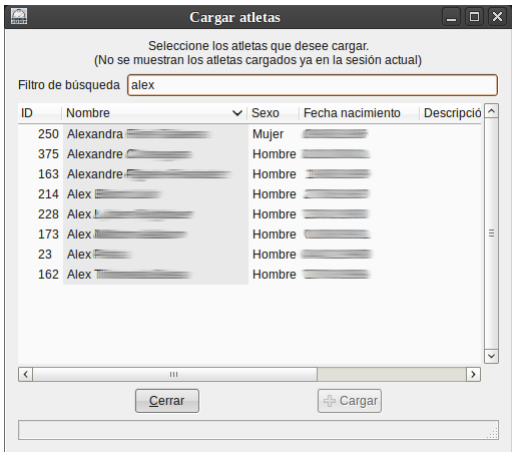
Figure 4.16: Load persons.
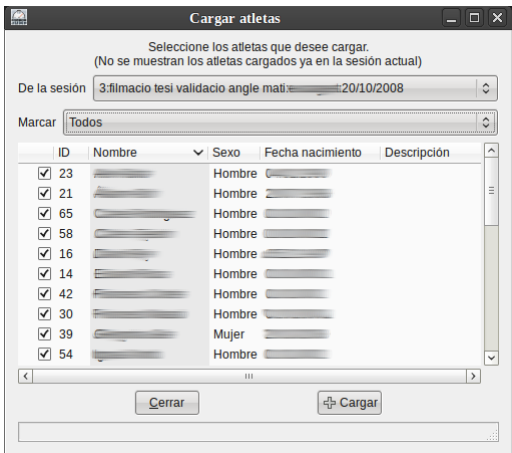
Figure 4.17: Load persons from other session.

4.5.2.6 Delete

Click *Delete current person* to be removed of the session. This operation will remove all tests from any person in the current session. It's important to know that the subject will not be removed from the database and the tests in other sessions remain intact.

After deleting this subject, another subject will become the *current person*. Otherwise any test can be provided.

4.5.3 Tests

So far Chronojump manages five types of tests: jumping, running, reaction times, rhythms and Multi-Chronopic. Later Chronojump can handle other tests. These tests are detected by the signals sent by the contact platform when the subject steps on and off it.

The database stores the tests and links to other data tables.

4.5.4 Diagram Database

In Figure 4.18 you can see a diagram of the database. To understand this diagram is necessary to know about relational databases. This includes the diagram for advanced users who are curious. The latest version of the diagram can be found here:

`http://git.gnome.org/cgit/chronojump/tree/sqlite_diagrams/chronojump_sqlite.png`
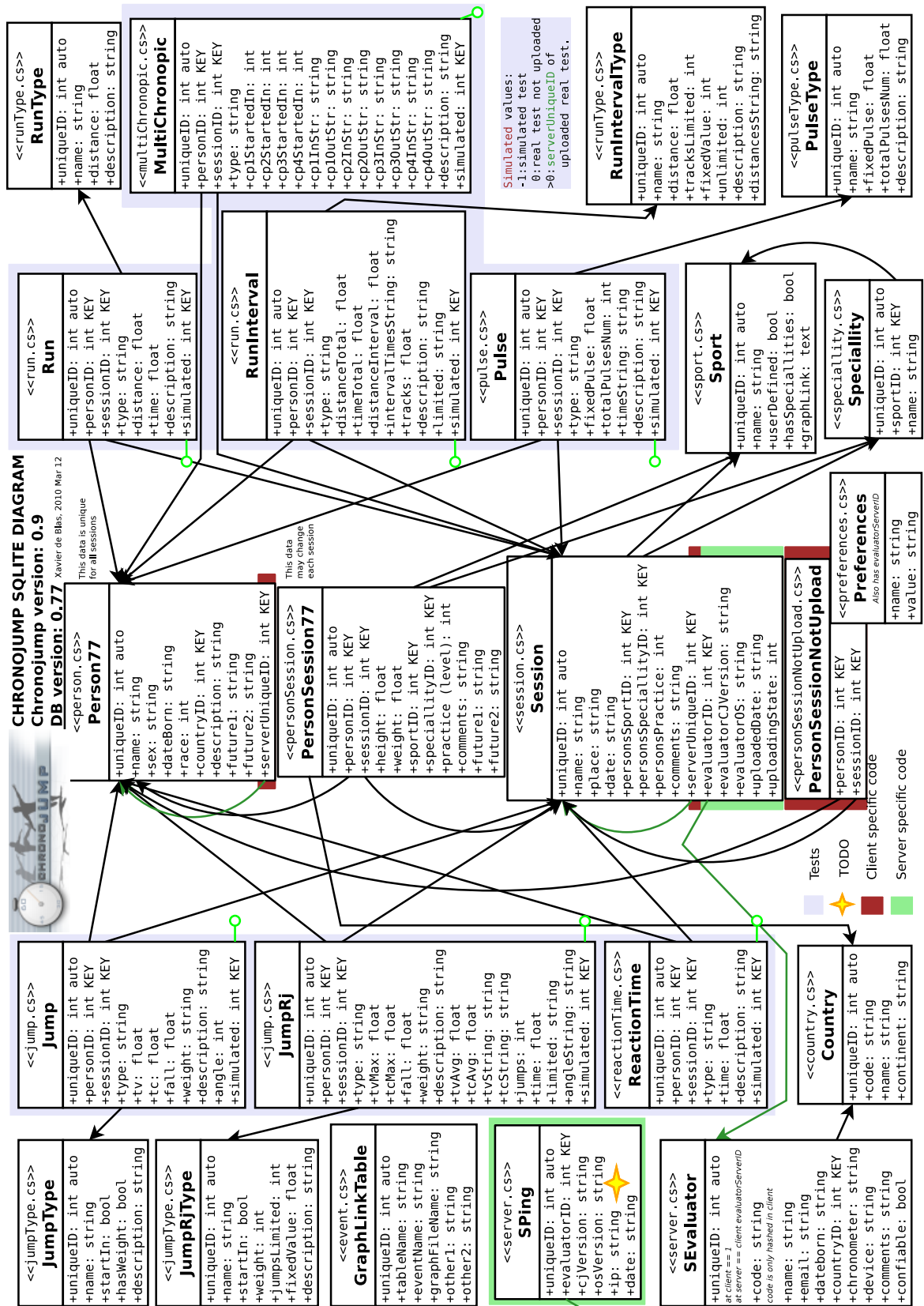
Figure 4.18: Diagram Chronojump database.

Chapter 5

Tests

At the following text, it describes the management of the five types of tests allowed in Chronojump software.

5.1 Jumps

There is basically two types of jumps: simple and repetitive. Chronojump detect a **single jump** as one phase of flight. That's why there are two types of simple jumps:

1. Those who start and finish on the platform (single hop).We obtain the variable flight time (TF)

2. Those who started outside the platform (drop from a height or do a jump before) to fall on the platform and then jump. Variables obtained: Contact time (TC) (time between reception and takeoff on the platform) and flight time (TF). Usually jumps will pursue minimum contact time and maximum flight time as a power indicator.

A **repetitive jump** (also called reactive) is when you obtain more than one flight time. For example: make two consecutive jumps initiated on the platform in the order TF, TC, TF or start outside the platform and continue with the order TC, TF, TC, TF.

Assuming that the body during the takeoff position is the same as in the landing, the flight time indicatives the height of center of gravity of the athlete in this jump.

5.1.1 Simple jumps execution

From the jumps tab, click the buttons:

- *SJ*, Squat Jump
- *SJ*l, Squat Jump with extra charge (extra weight)
- *CMJ*, countermovement jump
- *ABK*, jump with arms Abalakov
- *DJ*, drop jump
- *Rocket,* Rocket Jump is simple jump similar to the squat jump but it starts with a full flexion of the legs.

Sometimes you will be asked to provide additional information as the extra weight of the subject (SJL) or the height of the drop (DJ).

Click on *More* to get all the available of the simple jump and click ok on them to be executed. The jump menu also provides this access. The original protocol of Bosco for the *DJ* test indicates that the arms don't participate in the jump. Instead many coaches ask their athletes to use the arms because is more similar to the techniques used in sports. The original *DJ* is called *DJna* (no arms), while the *DJ* with arms is called *DJ*a. When you start a DJ test, the program will ask whether to use arms or not and automatically appoint the jump properly.

If Chronopic has not been connected and activated from Chronopic window, a jump will be simulated. In the other hand, if Chronopic is connected, real jump will be done. Note that for some jumps the athlete should be on the platform, while other jumps it's essential to be elsewhere. You will be notified if the athlete's situation is not correct. In the pop-up window it shows the progress of the jump, which may be stopped by clicking on the *Finish* or *Cancel* button.

If you want to execute the same type of jump to various persons and you don't want a button (only available on the tab *More*), you can change the subject and use the *Last* button to allow another person to perform the same jump.

5.1.1.1 Repetitive jumps execution

Click in the button on the Repetitive jumping tab:

- *RJ (j)*, Repetitive Jump (jumps) or repetitive jumping limited number of hops
- *Rj (t)*, Repetitive Jump (time) or time-limited repetitive jumping
- *Unlimited*, unlimited repetitive jumping.

Sometimes is necessary to provide additional information as the height of the initial drop, the extra weight or value of the limiting factor (hops or seconds). Click on *More* to get a list of all the available of the reactive jumps and execute them clicking OK. The jump menu also provides access to these actions.

If Chronopic has not been connected and activated from Chronopic window, a jump will be simulated. In the other hand, if Chronopic is connected, real jump will be done. Note that for some jumps the athlete should be on the platform, while other jumps it's essential to be elsewhere.

If you want to execute the same type of jump to various subjects and you don't want a button (only available on the tab more), you can change the subject and use the Last button to allow another person to perform the same jump.

5.1.2 Auditive and visual feedback in repetitive jumps: bells

In order to add a visual and auditory feedback during execution of the jumps, you can set values of flight time, contact time, or the relationship of both. To be shown a red bell (poor performance) or green (good performance) together with a distinctive sound. Click on the "Bells" to configure these actions as shown in Figure 5.1.

5.1.3 Jumps view

Simple jumps are shown on the *Jumps* tab and the reactive Jumps on the *Jump Reactive* tab. In both cases, it's included a filter for all the possible tests or only a particular type.

Tests are associated with the jumpers. The order of the tests presentation of each jumper is chronological so, the last test appears at the end of the list. It's included a button that allows sorting the tests by the type of jump and not in chronological order.

All jumps are selected in the view filter. A series of values are presented at each hop. It's possible to change the view by accessing at the Preferences (more information in section 9 on page 58).

You can use the *magnifying glass* button (or press *z*) to facilitate the view of the tests.

5.1.4   Jumps edition

You can add comments to a jump or change the person (if you forgot to change the current person previously) If you select the desired jump and click on the Edit button on the selected jump, you can also find it on the menu, or by pressing the button *e*.

In the reactive jumps, since they are composed of a set of jumps, this change will affect all the jumps even if only one is selected.

5.1.5   Repair repetitive jumps

Using *Repair selected* button or pressing *r*, you can add a jump, modify a contact time or flight time or delete a jump. If a repetitive jump type has been defined to be limited to max *n* jumps, or max *n* seconds, this conditions will limit the repair functionality. When this happens, you will find an information text on the bottom of the window.

5.1.6   Jumps delete

To delete a jump, select it and click the *Delete selected jump* button. Its equivalent in the menu or press *d* (delete). By deleting the test you will be asked to confirm it if the delete confirmation option is activated in the *Preferences* menu (more information in section 9 on page 58).

Deleting a repetitive jump will delete all it's jumps.

5.1.7   Creation of new jump types

In order to adapt the software to the needs of each user, it has been included the function: *Add jump type* (on *Jumps* menu). This allows trainer to define easily and powerully the desired jump types.

Created jump type will be available on database to be used at any session, and it will be listed clicking on the *More* button at the *Jump* or *Jump repetitive* tabs (depending on which kind of jump it's created). This new jump type will be also differentiated on statistics, graphs and reports.

On creation, you should give it a distinctive name and classify between simple or repetitive. If jump is repetitive, then you can limit is by jumps, time, or leave it unlimited.

The limit by time or jumps options can be defined as a fixed value or leaved as undefined. If it's defined fixed, all new jumps of this type will be limited to that value; in the other hand, if the type is not fixed, user will be asked by limit value everytime a new jump is done.

Last settings include: start inside or outside the platform, allow to jump with an extra weight, and add a description to the jump type. In the figure 5.2 you can see the creation of new jump type.

Figure 5.1: Bells - auditive and visual feedback.

Figure 5.2: Creation of a new jump type.

5.1.7.1   Examples on creation of new jump types

Here you can find some examples on creating new jump types. The names of the types have been invented in this manual. The table 5.1 is also useful to understand the different variables.

- *"SJ-N"* Jump like Squat Jump but the hands are on the nape instead of hips.

- *"DJ-Rope2"* Jump like Drop Jump but after executing the Drop jump, person have to jump again doing two turns with the skipping rope on the air.

- *"Triple"* Repetitive jump starting outside the platform and including three jumps.

- *"50%fatigue"* Repetitive jump that has to be done until arriving to 50% of the person's fatigue. The number of seconds needed to be fatigued is personal and is known previously by the trainer. Starts inside.

- *"RopeUnlimited"* Person has to jump the rope until trainer (or jumper) decides to finish. Start inside the platfom and can be done with an extra weight.

Name	Tipe	Limited by	Fixed	Start in	Additional weight
SJ-N	Simple	-	-	Yes	No
DJ-Rope2	Simple	-	-	No	No
Triple	Repetitive	Jumps	Yes(3)	No	No
50%fatigue	Repetitive	Time	No	Yes	No
RopeUnlimited	Repetitive	Unlimited	-	Yes	Yes

Table 5.1: Examples on jump types created by user.

5.2   Runs

Running can be detected by two kind of devices:

- platform/s

- photocell/s

On a run test Chronojump detects time between detection devices. If the run is "circular", it can be used a single device (platform or photocell), in the other circuits, there's a need of more than one detection device (of any type).

From now on, *device in contact* means that the person is on the platform or blocking a photocell signal. Is important to note that the person should never be in contact in more than one device at the same time.

The figure 5.3 shows a drawing of the position of two platforms to measure run.

In order to calculate average speed, user will be asked about the distance between platforms.

Runs can be of two types: simple and repetitive. On Chronojump a **simple run** means that there's only one track. There are two kinds of **simple runs**:

Running from stop Start on contact in a device and end in contact in the same or other device.

Running with initial speed Start before the contact, after a while, a contact is done and chronometer starts, then person leaves the detection device until it produces contact again. This allows to measure a run where person has an initial speed.

In both situations, the registered data is the time between one device and the other, also speed will be calculated.

An **intervallic run** is a run where there's more than one track, it should be understood as "run along two or more tracks limited by devices at a fixed distance".

5.2.1   Simple runs execution

To execute a simple run, click the following buttons on *Runs* tab:

- *Custom* to run after introduce the track's distance

- *20m-400m*, to run on the preselected track's distance

- Agility runs, this tests are available: 20 Yards, 505, Illinois, Shuttle Run, Zig-Zag test. The figure 5.4 shows the information available on software about the 505 test.

Click on *More* to see all simple runs available, and execute them clicking *Ok*.

If Chronopic has not been connected and activated from Chronopic window, a run will be simulated. In the other hand, if Chronopic is connected, real run will be done. Software allows to start run in contact with the device or before the contact. On the later situation, time between starting of the run and contact on the first device is deleted.

In the pop-up window it shows the progress of the run, which may be stopped by clicking on the *Finish* or *Cancel* button.

If you want to execute the same type of run to various persons and you don't want a button (only available on the tab *More*), you can change the subject and use the *Last* button to allow another person to perform the same run.

5.2.2   Executing intervallic runs

To execute an intervallic run, click the following buttons on *Intervallic Runs* tab:

By tracks: intervallic run limited by number of tracks

By time: intervallic run limited by number of tracks

Unlimited: unlimited intervallic run

At som run types, user interaction will be needed, like track distance and limit factor: tracks or seconds. Click on *More* to get a list of all the available of the intervallic runs and execute them clicking OK. The run menu also provides access to these actions.

If Chronopic has not been connected and activated from Chronopic window, a run will be simulated. In the other hand, if Chronopic is connected, real run will be done. Software allows to start run in contact with the device or before the contact. On the later situation, time between starting of the run and contact on the first device is deleted.

In the pop-up window it shows the progress of the run, which may be stopped by clicking on the *Finish* or *Cancel* button.

If you want to execute the same type of run to various persons and you don't want a button (only available on the tab *More*), you can change the subject and use the *Last* button to allow another person to perform the same run.

5.2.3 Feedback auditive and visual at the intervallic runs: bells

Similarly to the repetitive jumps, you can configure minimum and maximum values dor each track. A red bell will be shown on a bad execution, and a green bell on the opposite, also a distintive sound will be played.

Configure this actions clicking on "Bells".

5.2.4 Runs view

Simple runs are shown on the *Run* tab and the intervallic runs on the *Run intervallic* tab. In both cases, it's included a filter for all the possible runs or only a particular type.

Tests are associated with the runners. The shown order of the tests of each jumper is chronological so, the last test appears at the end of the list. It's included a button that allows sorting the tests by the type of run and not in chronological order.

It's possible to change tests view by accessing at the Preferences (more information in section 9 on page 58).

You can use the *magnifying glass* button (or press *z*) to facilitate the view of the tests.

5.2.5 Runs edition

You can add comments to a run or change the person (if you forgot to change the current person previously) If you select the desired run and click on the *Edit* button on the selected run, you can also find it on the menu, or by pressing the button *e*.

In the intervallic runs, since they are composed of a set of runs, this change will affect all the runs even if only one is selected.

5.2.6 Repair intervallic runs

Using *Repair selected* button or pressing *r*, you can add a track, modify a time or delete a track. If an intervallic run type has been defined to be limited to max *n* tracks, or max *n* seconds, this conditions will limit the repair functionality. When this happens, you will find an information text on the bottom of the window.

5.2.7 Runs delete

To delete a run, select it and click the *Delete selected run* button. Its equivalent in the menu or press *d* (delete). By deleting the test you will be asked to confirm it if the delete confirmation option is activated in the *Preferences* menu (more information in section 9 on page 58).

Deleting an intervallic run will delete all it's tracks.

5.2.8 Creation of new run types

In order to adapt the software to the needs of each user, it has been included the function: *Add run type* (on *Runs* menu). This allows trainer to define easily and powerully the desired run types.

Created run type will be available on database to be used at any session, and it will be listed clicking on the *More* button at the *Run* or *Run intervallic* tabs (depending on which kind of run it's created). This new run type will be also differentiated on statistics, graphs and reports.

On creation, you should give it a distintive name and classify between simple or intervallic. If run type is intervallic, then you can limit is by tracks, time, or leave it unlimited.

The limit by tracks or time options can be defined as a fixed value or leaved as undefined. If it's defined fixed, all new runs of this type will be limited to that value; in the other hand, if the type is not fixed, user will be asked by limit value everytime a new run is done.

User can also fix the distances of the tracks. La ventana de creación de nuevo tipo de carrera concluye con la posibilidad de añadir una descripción textual. En las figura 5.5 y 5.6 puede observar la ventana de creación de nuevos tipos de carreras.

Last settings include: fix the distance of the tracks, and add a description to the run type. In the figure 5.5 you can see the creation of new run type.

From Chronojump version 0.9, you can create intervallic runs with variable track distance. This is suitable to calculate speed in the different tracks of agility tests.

5.2.8.1   Examples on creation of new run types

Here you can find some examples on creating new run types. The names of the types have been invented in this manual. The table 5.2 is also useful to understand the different variables.

- *"Sprint10"* 10 meters of sprint run.

- *"SprintShortVariable"* Run below 20 meters, each runner will have run at a different distance defined by the trainer.

- *"20*5"* 100 meters run in 5 tracks of 20 meters.

- *"20*n"* 100 .Run 20*n meters (n tracks de 20 meters).

- *"40*50%fatigue"* Intervallic run where each person runs until 50%fatigue is reached. Time needed to fatigue is individual and known by trainer. Each track has 40m.

- *"100*?"* Person has to run tracks of 100m until trainer (or runner) decides to finish.

- *"2 min of 20-10-7"* Agility run on 3 tracks that have to be repeated during 2 minutes. First track has 20m, second 10m and third 7m.

Name	Type	Limited by	Fixed	Track length
Sprint10	Simple	-	-	Fixed(10)
SprintShortVariable	Simple	-	-	Variable
20*5	Intervallic	Tracks	Yes (5)	Fixed(20)
20*n	Intervallic	Tracks	No	Fixed(20)
40*50%fatigue	Intervallic	Time	No	Fixed(40)
100*?	Intervallic	Unlimited	-	Fixed(100)
2 min 20-10-7	Intervallic	Time	Yes(120")	Variable(20,10,7)

Table 5.2: Examples on run types created by user.

5.3   Reaction time

In order to detect reaction time of the person, there's a need of an assistant, because Chronojump and Chronopic are still unable to produce random signals that can be measured accurately.
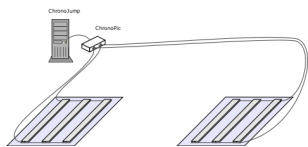
Figure 5.3: Drawing of two platforms circuit to measure run.
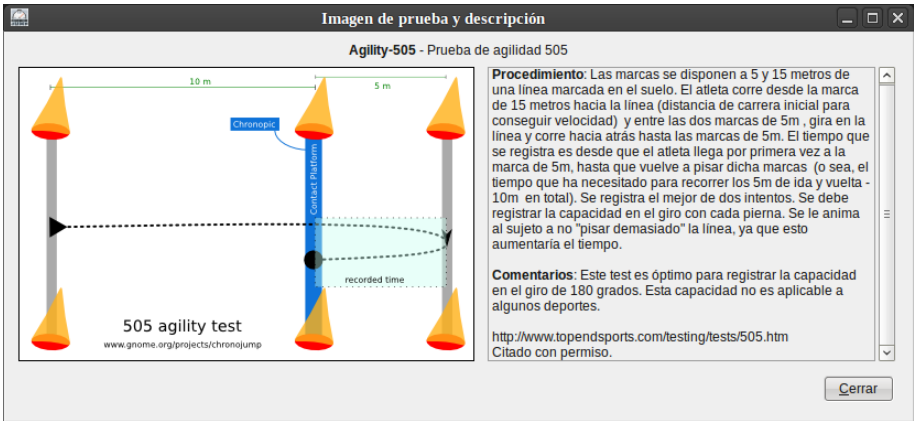
Figure 5.4: 505 Agility test.
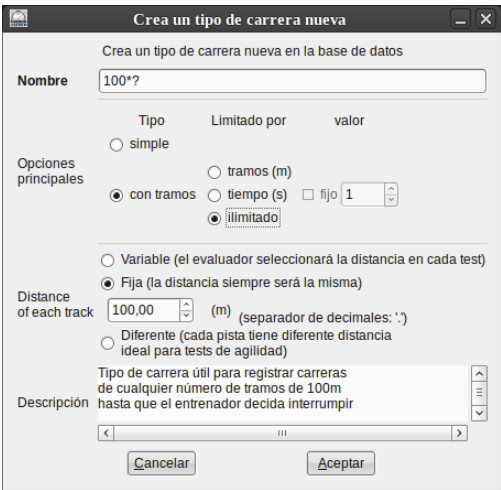
Figure 5.5: Creation of a new run type.

5.3.1   Protocol

Assistant will produce contact in a contact device: push-button, platform, photocell, ... and at any moment (when athlete is prepared), assitant will release the contact and instantly the Chronopic green led will light. At this moment, the athelete will produce contact in another contact device and green light will be off. The reaction time registered will be the time between light starts glowing and athelete produces contact. It's important that athlete doesn't see or hear the assistant.

5.3.2   Executing reaction time

To execute a reaction time, have the assitant producing contact in device, click on *Execute reaction time* and follow the protocol described above.

If Chronopic has not been connected and activated from Chronopic window, a reaction time will be simulated. In the other hand, if Chronopic is connected, real reaction time will be done.

5.3.3   Reaction times view

Reaction times are shown on the *reaction time* tab. Tests are associated with the athletes. The shown order of the tests of each jumper is chronological so, the last test appears at the end of the list

You can use the *magnifying glass* button (or press *z*) to facilitate the view of the tests.

5.3.4   Reaction times edition

You can add comments to a reaction time or change the person (if you forgot to change the current person previously) If you select the desired test and click on the *Edit* button on the selected test, you can also find it on the menu, or by pressing the button *e*.

5.3.5   Reaction times delete

To delete a reaction time, select it and click the *Delete selected reaction time* button. Its equivalent in the menu or press *d* (delete). By deleting the test you will be asked to confirm it if the delete confirmation option is activated in the *Preferences* menu (more information in section 9 on page 58).

5.4   Pulses (Simple rhythms)

A simple rhythm or pulse can be measured on the *Pulse* tab. On the other hand, if a comple rhythm has to be measured, use a MultiChronopic as described at 5.5 on the next page.

There are two kind of tests:

Free Person tries to be regular on the freely selected pulse. Evaluator will decide te moment where the test end.

Custom Person has to follow a predefined tempo. If desired, the total duration of the test can be defined.
Tempo can be defined in one of this ways:

seconds how many seconds pass between pulsations

ppm how many pulsations per minute

Both methods are interrelated, if eg. seconds value is changed, then ppm changes. As an example, 0.5 seconds are 120 ppm. Evaluator will decide what is more suitable.

5.4.1 Ejecución de pulsos

Desde la pestaña de *pulso* y con el ayudante sin tocar el pulsador o plataforma, haga clic en el botón: *Libre*, o en el botón *Personalizado*.

En caso que no este conectado el Chronopic, el programa simulará un pulso. En la ventana emergente se mostrará la progresión del test, que podrá ser detenido haciendo clic en el botón *Terminar* o cancelado con *Cancelar*.

5.4.2 Pulses view

Puede usar los botones de *lupa* (o la tecla *z*) para facilitar la visualización de los tests.

Pulses are shown on the *pulses* tab. Tests are associated with the athletes. The shown order of the tests of each jumper is chronological so, the last test appears at the end of the list

You can use the *magnifying glass* button (or press *z*) to facilitate the view of the tests.

5.4.3 Pulses edit

You can add comments to a pulse or change the person (if you forgot to change the current person previously) If you select the desired test and click on the *Edit* button on the selected test, you can also find it on the menu, or by pressing the button *e*.

5.4.4 Pulses delete

To delete a pulse, select it and click the *Delete selected pulse* button. Its equivalent in the menu or press *d* (delete). By deleting the test you will be asked to confirm it if the delete confirmation option is activated in the *Preferences* menu (more information in section 9 on page 58).

5.5   Multi Chronopic

Multi Chronopic allows any type of test that uses two, three or four independent measurements Chronopics. Remember that for the other tests it's possible to connect multiple devices to a single Chronopic, but it's understood that that always have to be in touch in one or both of them.

Unlike previous tests, Multi Chronopic allows the use of several Chronopics, each connected to one or more detection devices, so that contact can be more than Chronopic at a time. Their operating depends on the program user, but here are some examples:

1. Static Test running on two platforms: the aim is to assess the tempo of tread of the left and right foot. It's required that each Chronopic is connected and independent since the sportsman is often stepping on both platforms

2. The study of the contact times in a volleyball jump: One foot in each platform, then both take off at the same time. To know various times is needed 2 Chronopics platforms and 2 independents ones.

3. Plate Tapping with extra coordinative action: Construction of a device type detection Plate Tapping, where the tester must touch either side as quickly as possible with a single hand. Connect a conductive part to any side and to one Chronopic to record the different times. Moreover, if the subject should do something with his foot every 3 contacts we can locate a contact platform on the floor and connect it to a second Chronopic.

4. Two, three or four athletes do a round trip timed race on a track: there is placed a platform at the beginning and final of each lane. A Chronopic will be connected to the beginning and end platform because a person can't be at both at once. Thus, if there are 4 subjects it will be 4 lanes, 4 Chronopic and 8 platforms. We will be able to measure the times and speeds of each 4 independently.

5.5.1   Synchronization

Some of these tests require a synchronization to intend that the various Chronopics start at the same time. However, in others the synchronization is not required. In the first three examples cited above, synchronization is required so there is no error in the comparison of time between a tread and the other (example 1 and 2) or from contact with the tapping and the tread on the ground (Example 3). This sync can be selected from a check box and carried out by making contact with several devices at once, or by touching the Test of Chronopics. In the Chronojump Forum `http://forum.chronojump.org` is described a method for the construction of a professional sync device.

The sync in the fourth example requires discussion. If the subjects leave when they want and the aim is to record only the time between contact and the next synchronization is not required. On the other hand, sync is needed if we use the signal of an external evaluator, and when we expect to know the time between the signal (of any contact) and the first contact each athlete.

5.5.2   Erase first time

In some tests, the time of the first contact until the first change of state is not relevant.

Perhaps, the subject can begin whenever he wants. If you want to compare the subject's ability to follow an independent press with both hands (two Chronopics). The time registered since the start until the first contact is not relevant and should be removed to avoid contaminating averages.

5.5.3   Port configuration

Obviously, it's imperative to set up two Chronopic in the window Chronopic: *Tools / Chronopic*, to run the tests proposed.

5.5.4   Multi Chronopic results view

In the results window, we can observe different columns, if two Chronopic have been used:

- Time: The time from the beginning of the test CP1 and CP2

- State: Information on which change has occur in each Chronopic (if any) at the time point indicated in the previous column.

- CP1 and CP2 Change: Time elapsed since the last change of state in each Chronopic.

- IN-IN CP1 and CP2: Time elapsed since each Chronopic changed the state IN until he returned to the same state.

- OUT-OUT CP1 and CP2: Time elapsed since each Chronopic changed the state OUT until he returned to the same state.

- Description: Comments on the particular test run.

In the example in Figure 5.7 it shows a Multi Chronopic test duration: 0.928 seconds in which there are 10 state changes. Multi Chronopic 1, 2, 10n is called so because is used 2 Chronopics (Chronopics 1 and 2), and has 10 changes. If we observe the change number 5 it occurs at 0.539 seconds. This represents a change of status Out Chronopic 1 (no contact) within a (contact). As indicated in CP1 Change, 0.225 seconds have elapsed since the Chronopic was in its previous state (Outside) and 0.353 seconds since this was Chronopic (Inside) as reflected in IN-IN CP1.

Also note that the column IN-IN and OUT-OUT have average values and standard deviation (SD).

Just as the other tests, the tests are associated with the performers. The order of presentation of each test in each performer is chronological so the latter carried out by a subject appears at the bottom of the list of the tests. You can use the magnifying glass button (or press *z*) to facilitate the visualization of the tests.

5.5.5 Multi Chronopic test edition and erase

You can add comments to a test or change the performer (if you forgot to change the current subject previously) by selecting the desired test and click on the *Edit Multi Chronopic* button. It can also be done in the menu or press *e*.

To delete a Multi Chronopic test, select it and click the *Delete Multi Chronopic* button selected. Its equivalent in the menu or press *d* (delete). By deleting the test you will be asked to confirm it if the delete confirmation option is activated in the *Preferences* menu (more information in section 9 on page 58).

5.5.6 Run analysis

In addition to the examples given we have to include a test to analyze the run produces by Josep Maria Padullés as part of his doctoral thesis. As sense devices it's used two photocells barriers and a track with contacts platforms.

The two photocells are connected to the **first** Chronopic to know the time between them. The program evaluator will indicate the distance between them and thus it can be known the average speed. The track of platforms will be connected to the **second** Chronopic, which will give us the contact time and flight time. In this case the synchronization between Chronopics or deleted the first time is not required.

From the data obtained by both Chronopics, you will get the average speed of the race, and the following data for each of the steps:

- Contact times
- Flight Times
- Total Time
- Frequency
- Amplitude
- Height
- Takeoff angle

You can see an example in Figure 5.8. Note that the execution button Running Analysis will be activated when the distance between the photocells and the two Chronopics are connected.

Figure 5.6: Creation of a new run type with variable tracks.
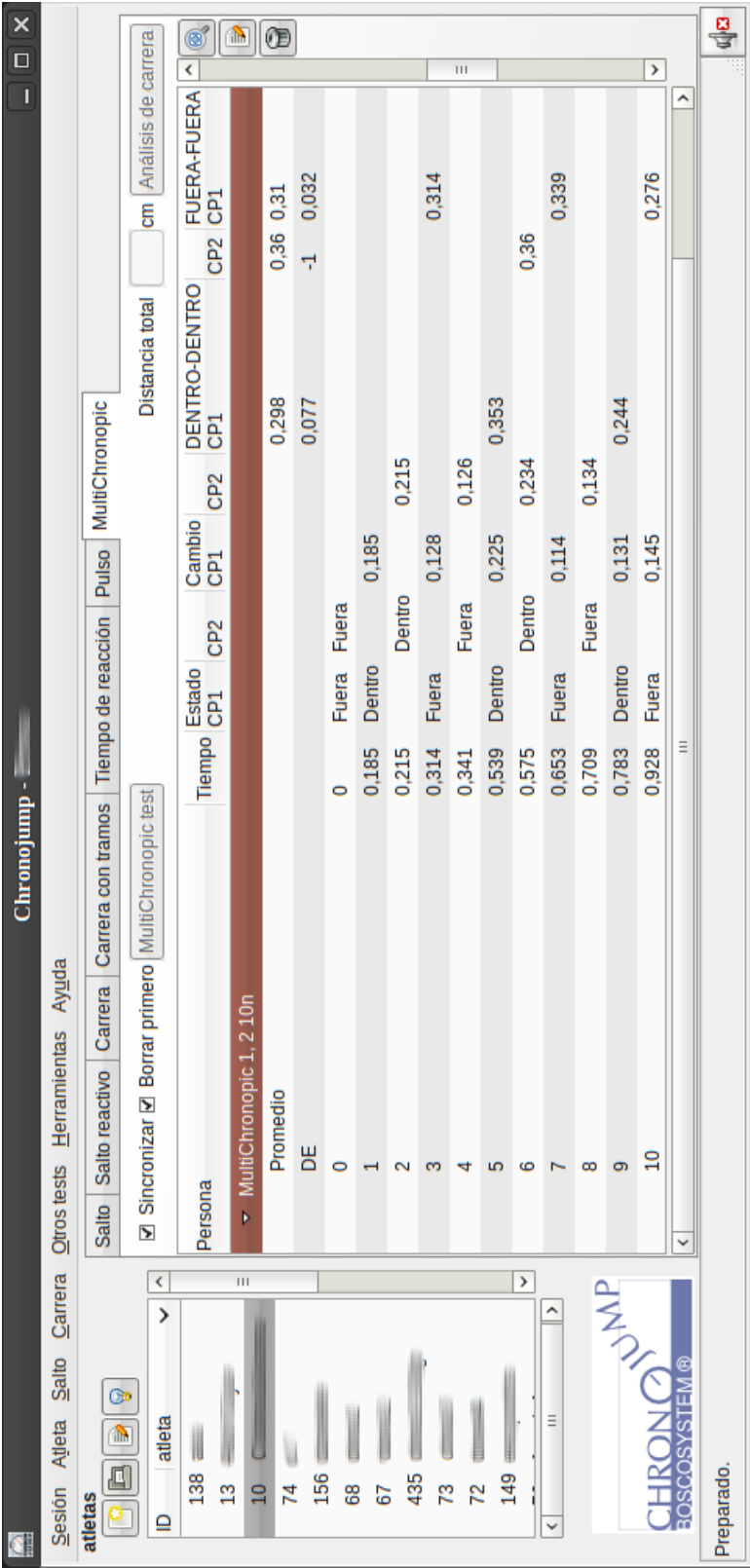
Figure 5.7: Multi Chronopic screenshot.
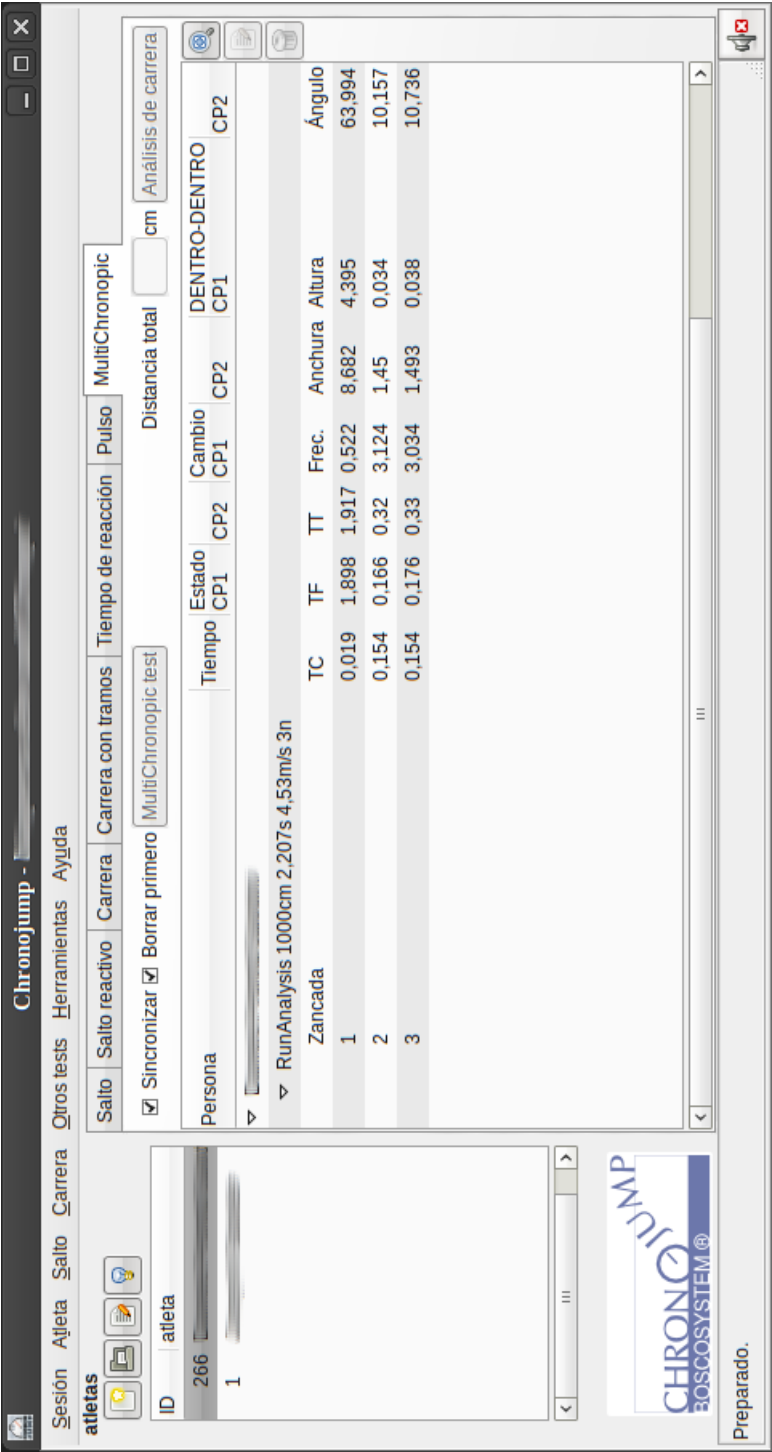
Figure 5.8: Multi Chronopic screenshot with Run Analysis results.

Chapter 6

Statistics and graphics

Chronojump has multiple indices to study the tests proposed. Unlike general spreadsheets purpose, the provision of statistical and graphics has been designed specifically to measure jumps and running. Figure 6.1 shows the statistics window that appears when you click on *Tools / Statistics*.

The current version only provides statistical Chronojump concerning to jumps. Future versions will also include other statistical tests. If you have graphics and other statistical tests, we recommend that you export the worksheet data as described in Section 7.2.

6.1 Statistic type, subtype and applications

Each statistic can be classified by type, among which are:

Simple jumps which offers several ways to analyze simple jumps without contact time.

Simple jumps with contact time which offers various ways to analyze simple jumps with contact time.

Reactive jumps which presents several ways to analyze repetitive jumps.

6.1.1 Simple jumps

The simple statistical hop show various ways to analyze simple jumps without contact time, which can be classified into several subtypes:

- No index

- Force-velocity

- Elasticity rate (IE)

- Use of arms index (IUB)

- Power peak of Lewis, Harman, Sayers (2), Shetty, Canavan, Lara (5)

6.1.1.1 No index

Statistical simple jump that shows all the jumps or a particular type as selected on the *application* field.

Figure 6.1: Chronojump statistics window.

6.1.1.2 Force-velocity

Statistical simple jump that shows the force-velocity relationship according to the formula

$$FV = \frac{SJ + (100\%)}{SJ} * 100$$

SJ jumps with 100% extra charge to the body weight, and SJ with no additional charge.

6.1.1.3 Elasticity index

Statistical simple jump that shows the elasticity index formula

$$IE = \frac{(CMJ - SJ)}{SJ} * 100$$

between SJ and CMJ jumps.

6.1.1.4 Use of arms index

Statistical simple jump that shows the rate of the use of arms from the formula

$$IUB = \frac{(ABK - CMJ)}{CMJ} * 100$$

between CMJ and ABK jumps.

6.1.1.5 Peak power

Figure 6.2 is the ratio of power peak of the individual authors and their formulas. In the future, is expected to include expanded documentation for each formula and literature.

6.1.2 Contact time jumps

The most important in this type of jump is the relationship between flight time and contact time. In many sports it's necessary to generate a high power (reflected in the flight time) in a short time (represented by the contact time). We present two indexes to study the relation:

- Dj Index
- Index Q

The application field in both cases refers to the type of jump that is applied to the statistic.

6.1.2.1 Dj index

Study of the relationship between time of flight / time of contact in a single jump from the formula

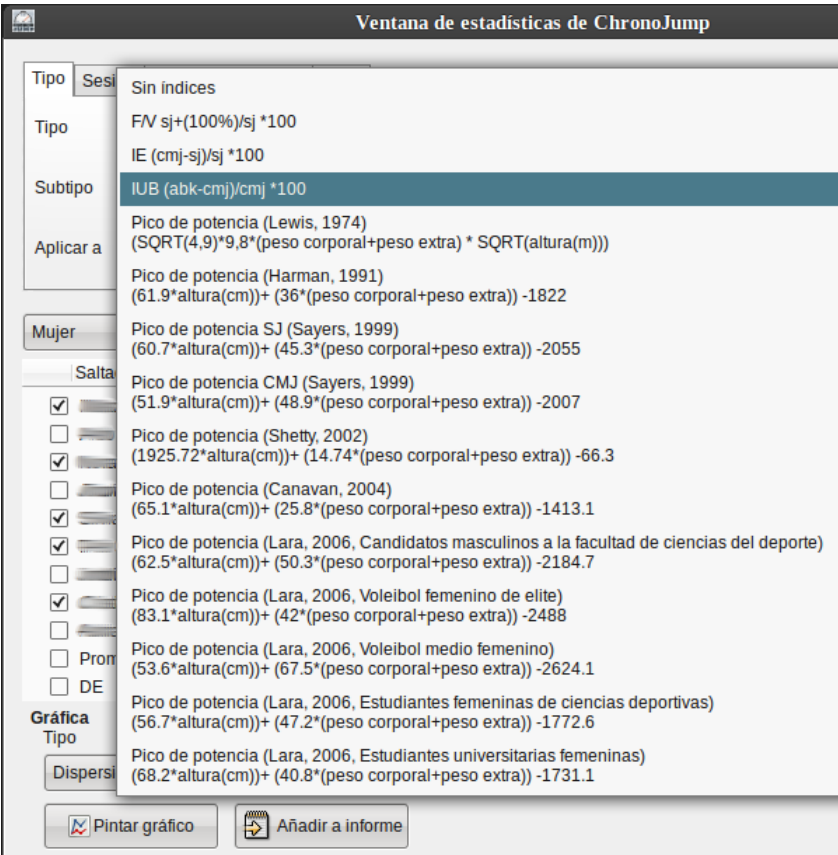$$DJindex = \frac{TF - TC}{TC} * 100$$

Figure 6.2: Statistics of simple jumps.

6.1.2.2 QIndex

Study of the relationship between time of flight / time of contact in a single jump from the formula

$$QIndex = \frac{TF}{TC}$$

6.1.3 Repetitive jump

In the repetition of a jump test specified by a number of jumps, time, or unlimited ends when the coach or athlete decides it. It represents the evolution of flight time with respect to the contact time in the different jumps. With this objective are the following statistics:

- Average index

- Power (Bosco)

- Evolution

- Mean and standard deviation using RjIndex

- Mean and standard deviation using QIndex

In all cases the application field refers to the type of jump that is applied to the statistic.

6.1.3.1 Average index

Study of the relationship of flight time / contact time in the repetitive jump according to the formula

$$AverageIndex = \frac{TFmean - TCmean}{TCmean} * 100$$

6.1.3.2 Power (Bosco)

Study of the relationship of flight time / contact time in the repetitive jump according to the formula

$$Power = \frac{9.81^2 * TFmean * jumps * totalTime}{4 * jumps * (totalTime - TFmean * jumps)}$$

6.1.3.3 Evolution

Study of the relationship of flight time / contact time over the repetitive jump according to the evolution of the formula $Evolution = \frac{TF}{TC} * 100$ for each twitching.

Sometimes some athletes do a jump with a very good TF / TC because of the execution of a low one before or afterwards. For this reason it has arranged the option to make the best 'n' row to get a selection of the best range following this index. To the right of this option you can find the amount of jumps you want to study. If you select a value of 1 then the best jump will be highlighted.

6.1.3.4 Mean and standard deviation using RjIndex

Study Index

$$RjIndex = \frac{TF - TC}{TC} * 100$$

for each of the jumps of the repetitive jump test it's shown the average and standard deviation obtained.

6.1.3.5 Mean and standard deviation using QIndex

Study Index

$$Qindex = \frac{TF}{TC} * 100$$

for each of the jumps of the repetitive jump test it's shown the average and standard deviation obtained.

6.2 Multisession statistics

All statistical presented except the Evolution in the repetitive jumps can be used for the comparison of different jumps or subjects in several sessions. This will submit a column for each selected session and facilitates comparison between the different values shown.

It also includes the average and standard deviation of each row displayed.

To access to the statistics multisession click on *session / selected* and select the sessions you want to use in the window that appears when you click on *Select*. You can select as many sessions as desired and is not required to display the current session between them.

6.3 Selection of the jumps to be shown

There are four selection modes for the jumps shown as a condition in the generation of statistical expectation:

All shows the results of the selected statistics.

Limit n shows the first n selected statistical results.

Average shows the average of each jumper in the selected statistic.

Max /s of the jumper show *n* maximum values of each jumper in the selected statistic.

Most of the statistics offers the four options. Those omitted is because is not a purpose generate them.

6.4 Other settings

Other related action buttons presented below.

6.4.1 Statistics formulation

All statistics have a statement that is automatically created based on the selections made by the user in the statistics window. The statement can help you understand the statistics.

6.4.2 Genus distinction

It presents the option of distinguish between genders for the presentation of the results. Selecting this option you can have a dual behavior:

- When the result rows correspond to the statistical index or jumping, gender selection will lead automatically to the creation of a row for each of them.

- When the result rows of statistical correspond to the subjects, it will appear a letter at the end of the subject to indicate the gender.

This button can help intra and inter genus comparisons.

6.4.3 Automatic actualization

The statistics window Chronojump is designed so each change in the database (new jump, subject rename, delete, jump, change jumper who has made a jump ...) is updated directly.

6.5 Marked rows

In the first column of each row you will find a small box that allows you to select whether or not a row is taken into account for the graphs and reports generated with Chronojump. The first row contains a checkbox that lets you quickly select and deselect all values. Furthermore, we show a selection box at the left bottom that allows you to expedite the selection of rows based on different criteria. For more information on charts and reports in paragraphs check 6.6 and 7.1 respectively.

6.6 Graphic creation

Chronojump can create any graphics of any of the data shown in the statistics window. To do this simply click on the Graph button that appears in the statistics window. In the figures 6.3, 6.4, 6.5, 6.6 there are some examples of graphics generated.
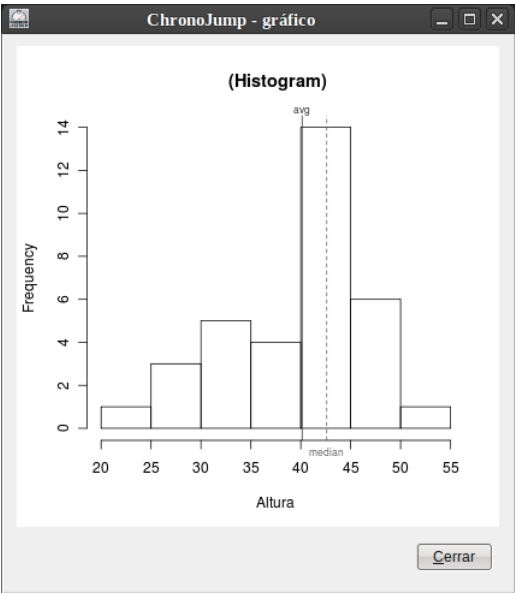
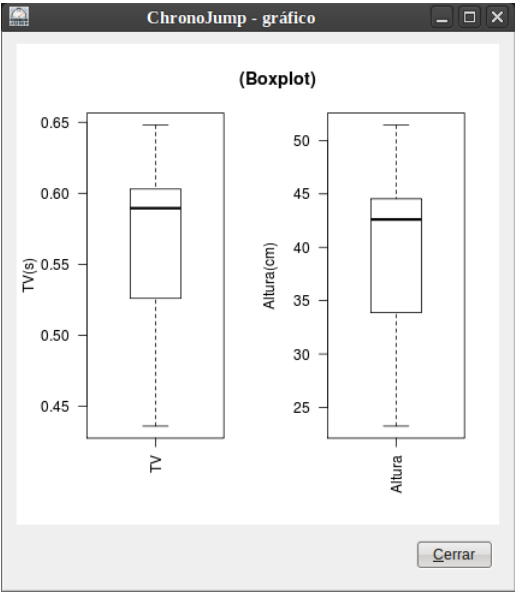Figure 6.3: Graph example: Histogram of a height of jump.
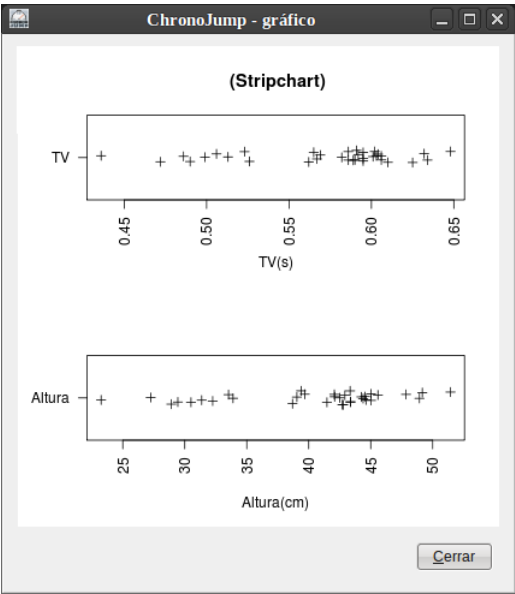

Figure 6.4: Box diagram of the same values.

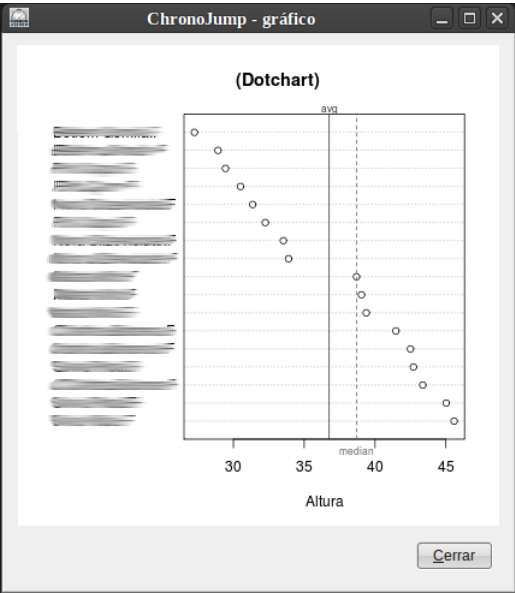Figure 6.5: Graph stripchart of the same values.

Figure 6.6: Graph dotchart a subset of the above values.

Chapter 7

Report and export

We propose two ways to work with raw data using Chronojump. First of all: *Reporting*, with the utility to create a web page with the content of the session as well as selected statistics and graphs. After this: *Export to spreadsheet* data. Export to the tests program analysis with general purpose spreadsheet (spreadsheet).

7.1 Report generation

Reporting on the program Chronojump is the best way to collect information, statistics and graphs, in one session. This information can be in one study or with the comparison of various.

Clicking on *Tools / Report*, the figure shown is Figure 7.1. The users have the ability to create a report in web format (HTML) which can include session data, the subjects who participated and the tests chosen. Furthermore, using the *Add to report* button is allowed to prepare each of the statistics displayed. Do the apparition in the report generated and the customization that was chosen by the user in the statistical window. The user can also organize each of the statistics to do the final report.

Clicking on *Make Report*, you can choose the filename to save the HTML document. Also, you can generate a folder that will include all necessary images and styles to display the page properly.

To print the report, we strongly recommend using the free browser Mozilla Firefox because Internet Explorers printer is very respectful to the original. In Figure 7.2 you can see a photo of a report.

7.2 Export to a spreadsheet

Clicking on *Session / Export session to CSV* to create a CSV file format (Comma Separated the Values) which can be easily imported into any spreadsheet program. This file contains the records of all the tests produced, but it shall not include statistical or graphics.

To export to CSV we chose the semicolon character (instead of comma character) to separate the different columns of data. Remember to indicate it when you import the CSV file in the spreadsheet.
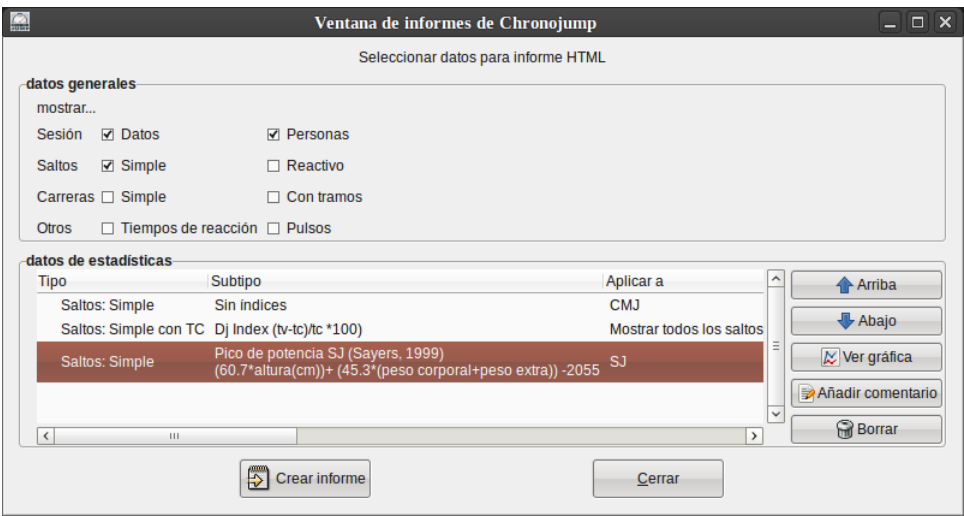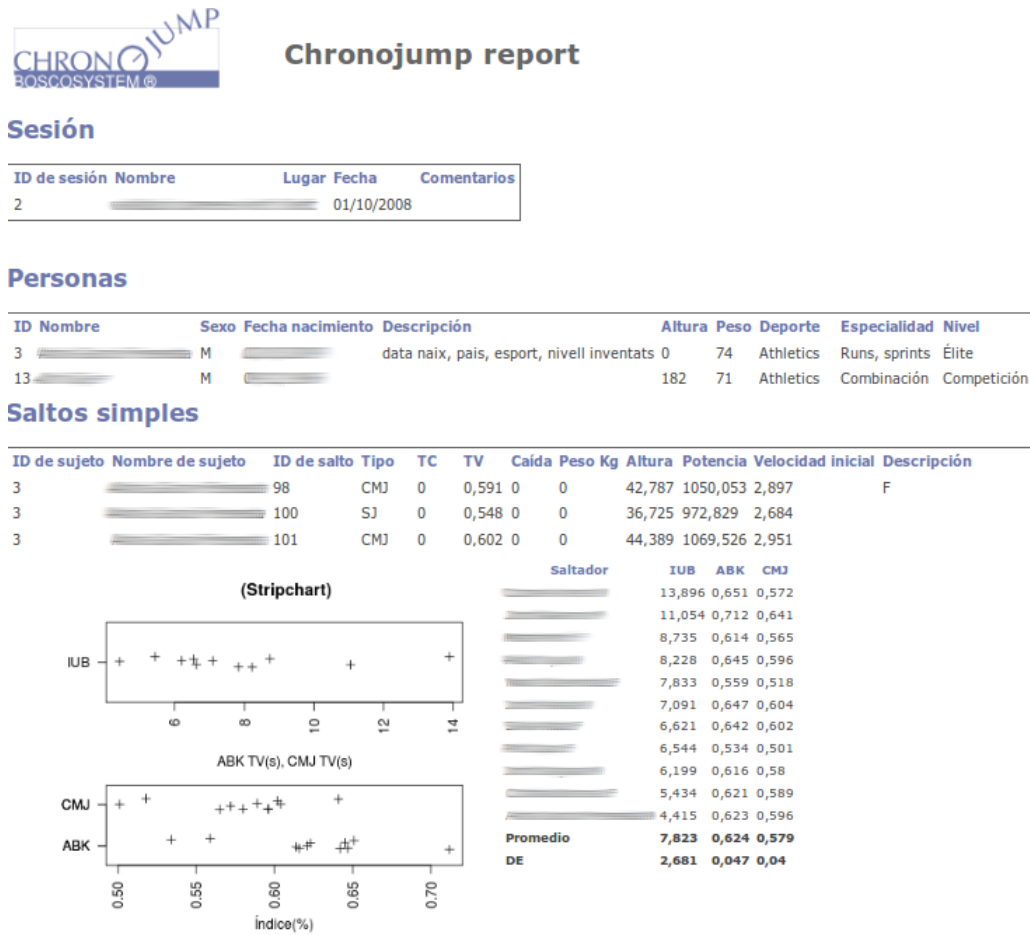
Figure 7.1: Example of report window preparation.

Figure 7.2: Example of a website report.

Chapter 8

Share Data Server

Chronojump has a server to share data between users on Internet. The server will obtain valuable data from the cross of many variables. For this, the users may share the data Chronojump. We believe in the good quality and usability of the technical characteristics of the server.

Chronojump dispone de un servidor en Internet para compartir datos entre los usuarios. El servidor permitirá obtener datos valiosos a partir del cruce de muchas variables, pero para ello es necesario que exista predisposición por parte de los usuarios de Chronojump para compartir los datos. Creemos que las características técnicas del servidor y su usabilidad son óptimas.

8.1 Share and use the data

The data that can be shared are the tests, subjects and sessions of each evaluator at any time. The evaluator may upload to the server any session, dismissing those athletes and tests that he doesn't want to share. Before upload the data to the server, check if they have completed the necessary data from each of the athletes as well as the data required from the evaluator.

8.2 Data quality. Accredited assessors and reliable data

In order to get a lot of data, without sacrificing the quality, there are two types of data in terms of reliability:

The general data that can be upload from anyone with the Chronojump technology. This will soon be available for many data that belongs to this category.

The reliable data requires the accreditation of the evaluator and the justification of the session data. This deals with three different profiles of the evaluator:

> **Evaluator-trainer** profile: person related to the field of training.
>
> **Evaluator-researcher** profile: person related to the academic field.
>
> **Mixed profile:** person involved in the two areas mentioned above.

> The process of accreditation of the assessors has not yet begun, so all assessors are currently uncredited and the data shared corresponds to general data. In the future, the new credited evaluators may wish to upload their data to the reliable data, even if this data has been uploaded without the accreditation.

> The accreditation is in charge of the Research Group: Salut, Activitat Física i Esport at the Blanquerna Faculty (Universitat Ramon Llull).

8.3   Server functions

Server functions can be located in the main menu, *Tools / Server*. Below its described each of them.

8.3.1   Check connection

Allows connecting to the server. If not possible, it may be because the server is temporarily inoperative, your computer is not connected to Internet, or your Internet connection has limit on some types of connection.

8.3.2   Evaluators data

This feature allows the evaluator to fill in a sheet which will be linked to the tests, subjects and sessions that will be shared. The personal information will be hidden. It's necessary to provide evaluation data for the following reasons:

- It's essential for uploading data.

- Allows knowing the nationalities, ages, equipment, evaluators. . .

- If problems occur with some data, the administrators can contact via mail to the server of the evaluator.

As discussed in Section 8.2, currently the accreditation is not required, so the sheet that has to be filled is very short. See Figures 8.1, 8.2 and 8.3. to check the for data window for the evaluators.

8.3.3   Upload or actualize session to server

This is the most important function to share data. When the evaluator click on *Tools / Server / upload (or update) session to server*, he must follow this steps:

1. First, the evaluator will be asked to verify the data as described in paragraph 8.3.2,

2. then the evaluator will be asked if he wants to discard some of the subjects of the session (see Figure 8.4),

3. then he will be asked for the confirmation,

4. finally it shows a progress window of data to be incorporated into the server.

At any time the evaluator can re-upload the session to the server (update). The data that has already been uploaded will not be included again, but it wills so, the data created the last time.

The tests that have been simulated (not obtained from Chronopic) will be uploaded to the server.

8.3.4   Query the server

It has been created a window that allows average of the simple jumps, reactive jumps and simple runs. To access to it click on *Tools / Server / Query*. The query is performed clicking on the test selectors and the subject selectors.

Below, we can observe the selectors of the query. Some of them are mandatory, while the most can be selected on *Any* to indicate that this variable should not affect the result.

Figure 8.1: Details of the evaluator, Tab 1.

Figure 8.2: Details of the evaluator, Tab 2.

Figure 8.3: Details of the evaluator, Tab 3.

8.3.4.1 Test selector

Here are the three selectors and possible values:

Test type: simple jump test, reactive jump or simple run.

Test: correspond to the type of test described above.

Variable: the average obtained will be different depending on the test selected:

- For a simple jump test without contact time the only variable is the *flight time*.

- For a single jump with contact time, the variables are: *time of flight, contact time, Index DJ* (see 6.1.2.1), *Index Q* (see 6.1.2.2).

- For a reactive jump the possible variables are: *Average Index* (see 6.1.3.1) and *Power (Bosco)* (see 6.1.3.2).

- For the running the only variable is the *time*.

8.3.4.2 Selectors on the subject

The selectors are:

Sex

Age: Refers to the age of the subject at the time the test is made. To calculate the age of the subject it's used the date of the birth.

Country

Sport: Sometimes subdivided into specialty.

Level: Divided into: [0] sedentary or occasional practitioner, [1] regular practice, [2] competition; [3] elite.

8.3.4.3 Evaluator selector

Any data from a particular evaluator can be chosen. This option may be interesting even for yourself because this way is possible to quickly gather information from all the jumps that have been evaluated.

8.3.4.4 Query results

When you click the search button, after a few seconds the server will indicate how many results have been found and which is the average.

It is recommended to conduct general searches because the server has been created recently. As an example of search, try with simple jumps (Free) with most of the indicators on *Any*.

In Figure 8.5 is an example of consultation.

8.3.5 Server main statistics

It has been programmed a window to get a snapshot of the existing data on the server. It shows the number of evaluators, as well as the subjects and the various type tests. Also indicated which data has been uploaded by the user who runs the program.

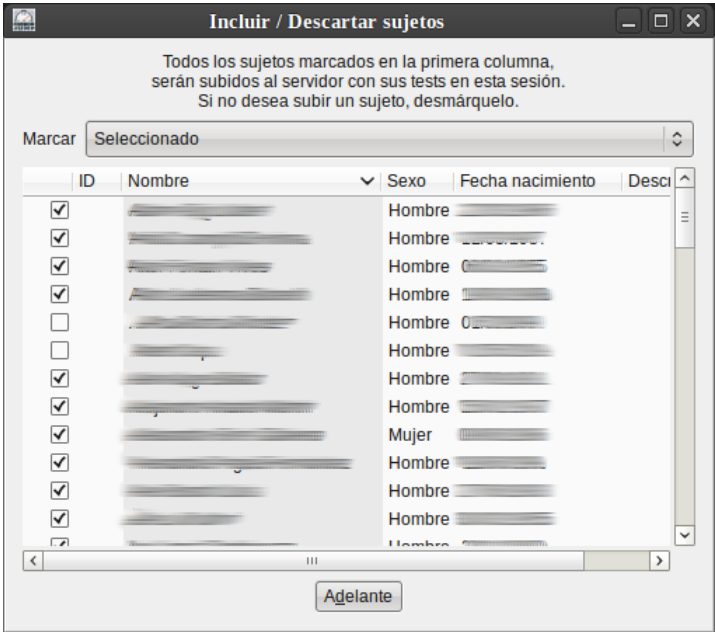You can access to this window by clicking on *Tools / Server / Statistics*.

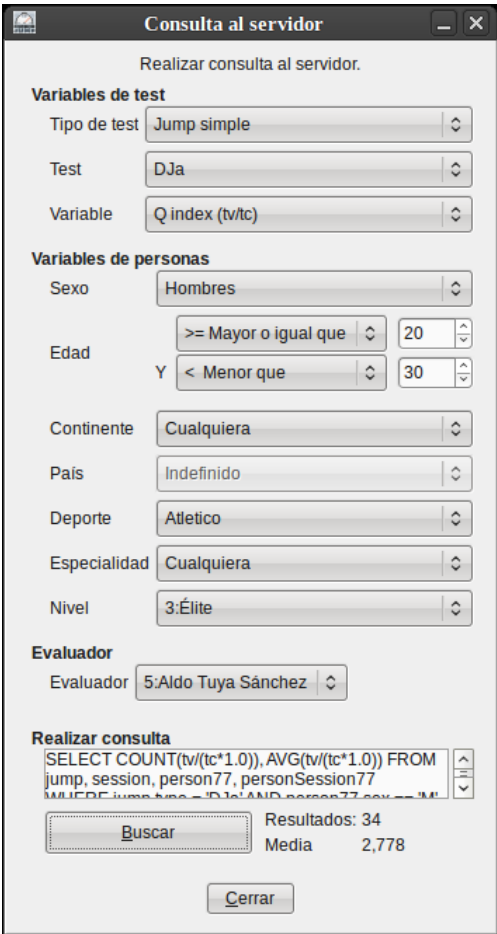Figure 8.4: Include / Discard subject to the server.

Figure 8.5: Query the server.

8.4   Web statistics

The web page `http://www.chronojump.org/server.html` shows the results from the crossing variables updated from the server. These charts are updated every time new data is included (usually automatically at night). The aim is to create constantly a set of charts that provide relevant information to anyone interested, even without using Chronojump.

In Figures 8.6, 8.7, and 8.8 it's possible to check some examples of graphics that are obtained on the web server.

8.5   Jumps privacy and confidentiality

The names and dates of birth of the athletes and the evaluators will never be shown. Even when uploading the data, the names of the subjects are not sent (because is not required). The date of birth will be included to calculate the age, but it will never be displayed. The comments the evaluator add to the session, subject or test are neither provided.
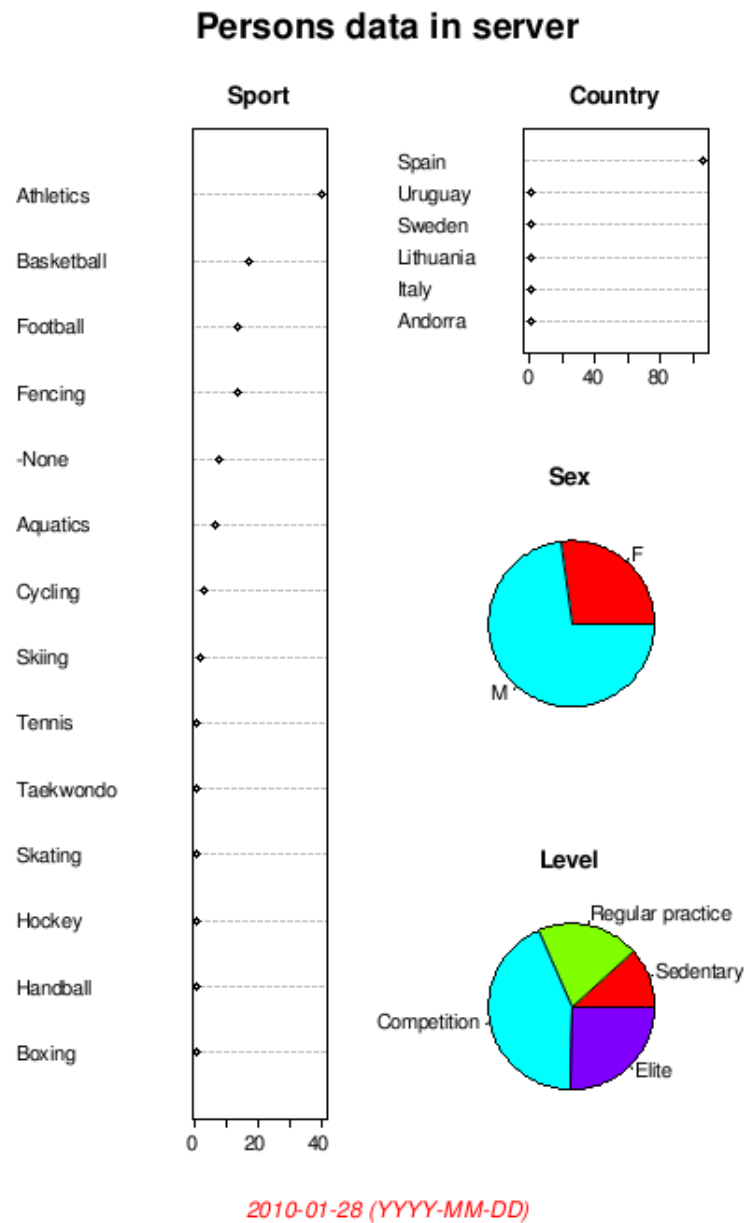
Figure 8.6: Statistics on the web server. Population graphic description.
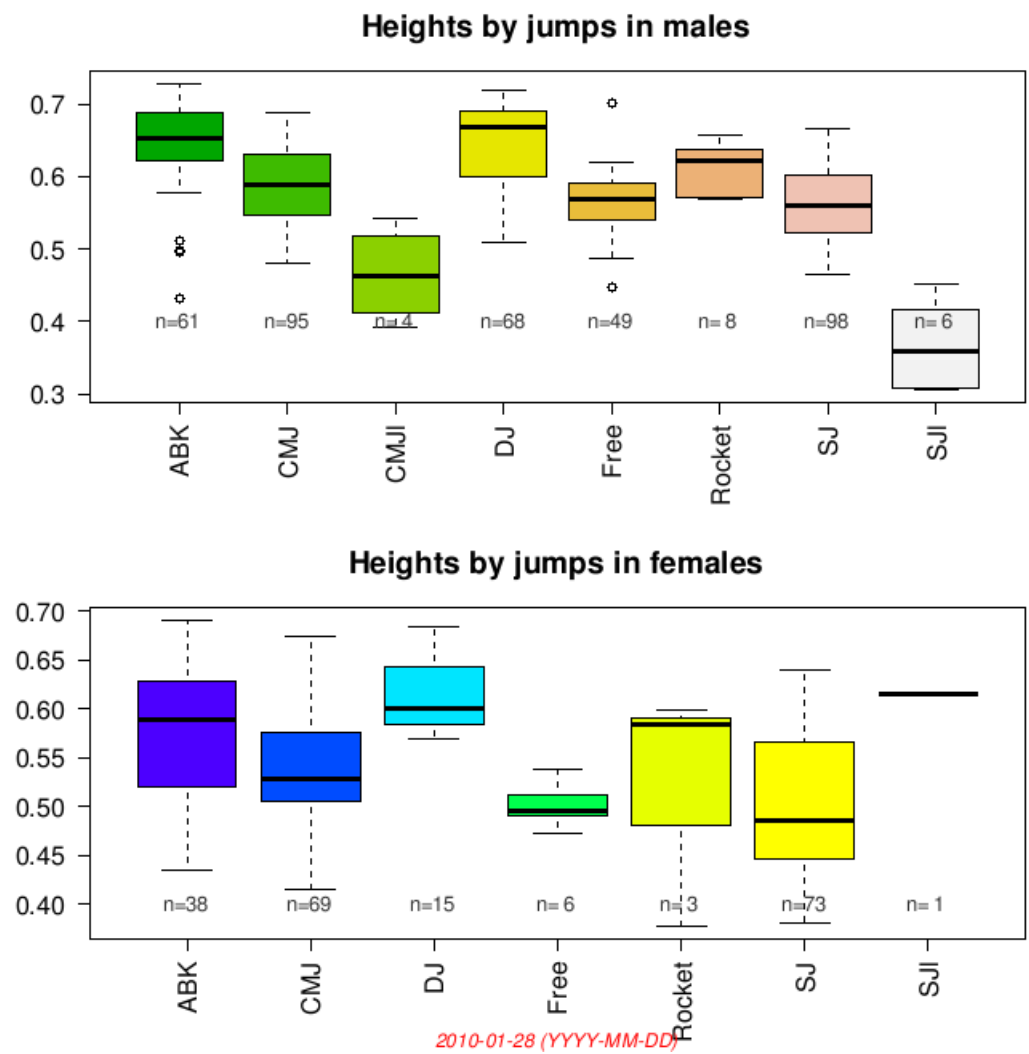
Figure 8.7: Statistics on the web server. Boxplot flight time depending on the type of jump and gender.
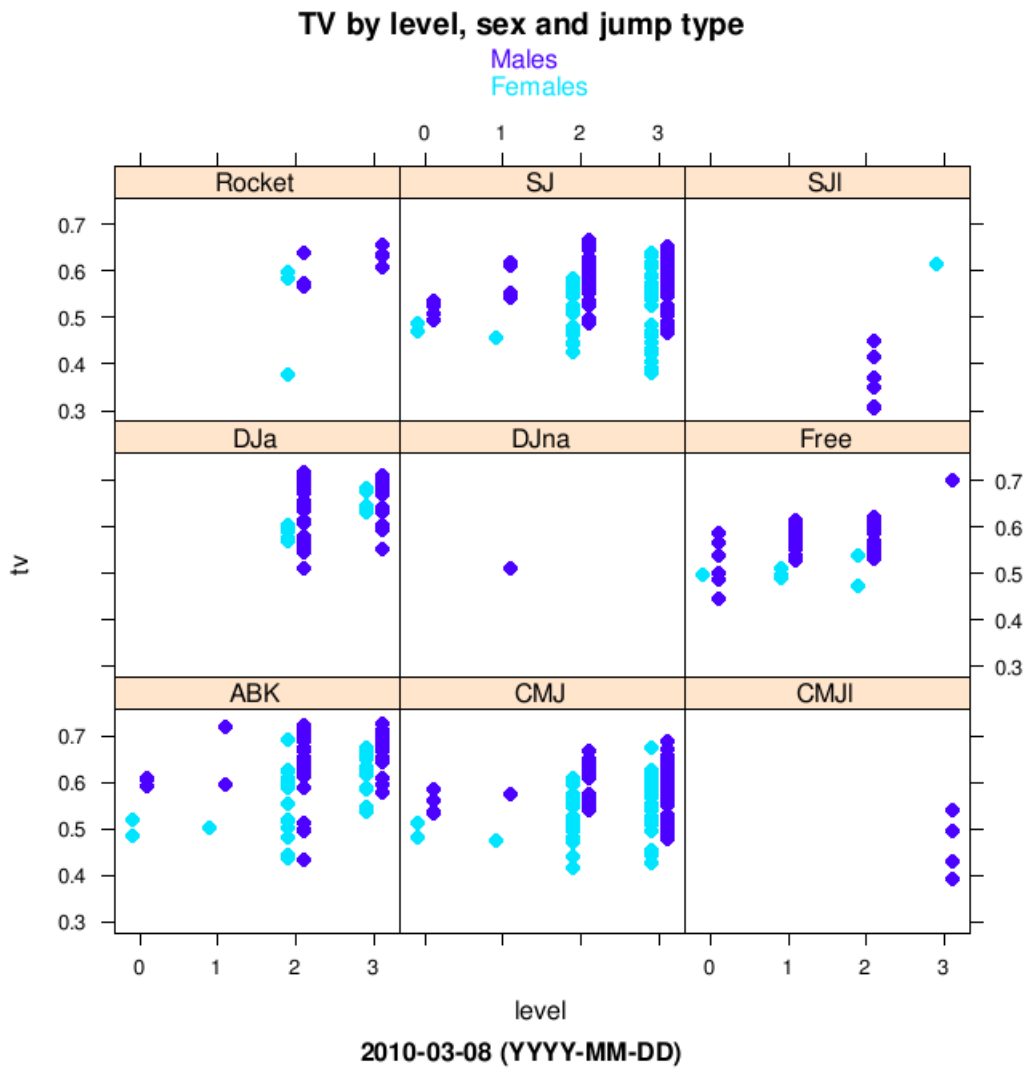
Figure 8.8: Statistics on the web server. Graph relates flight time, practical level, type of jump and gender.

Chapter 9

Preferences

The preferences window *Tools / Preferences*, is divided into three tabs:

Database (Figure 9.1) shows where you are, to open the folder, and make one copy of it in a directory of choice for the users. It shows two possible locations for the database because some operating systems offer a place to store data while the program runs, and another when it's closed.

Show (Figure 9.2) the options of which are the columns of information you want to display in the windows of data and statistics.

Other (Figure 9.3) The first two options refers to the number of decimals (recommended 3), and how to delete them of the test. The last action is specific to the time limited reactive jumps. If you use these tests, click here to check which behavior you prefer when the subject is in the air at the end of the set time.
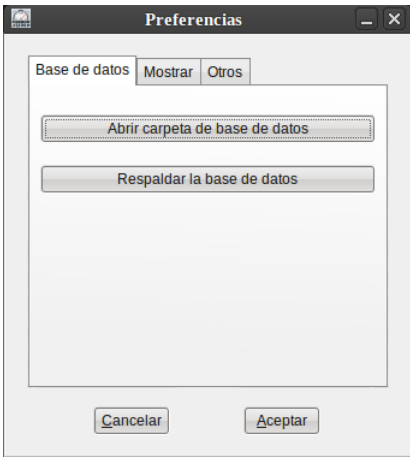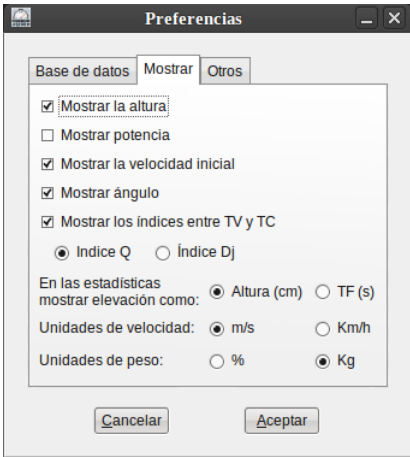
Figure 9.1: Window preferences - Tab 1.
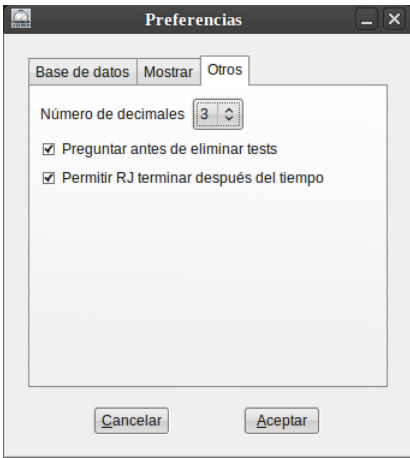

Figure 9.2: Window preferences - Tab 2.

Figure 9.3: Window preferences - Tab 3.

Appendix A

Chronopics prior to Chronopic 3

This appendix is only useful to users who own an old Chronopic (sold before March 2008).

A.1   Chronopic versions

Version	Launched	Connection	available at*	Price*
Chronopic3 (fig 3.1)	March 2008	USB	Sent to all the World	37€
Chronopic2-USB (fig A.1)	September 2007	USB	Argentina	150$ argentina
Chronopic2-Seral (fig A.2)	September 2007	Serial	Argentina	150$ argentina
Chronopic1 (fig A.3)	2005	Serieal	Spain	70 €

* Currently, only Chronopic3 is commercialized. If you want it, just visit Chronojump store: `http://www.chronojump.org/hardware_store.html`

Table A.1: Chronopic versions.

A.2   Connections in Chronopics serial

Chronopics serial require external power therefore it should be connected to a feeder. In addition, these Chronopics requires to be connected to the computer by a cable. If your computer has serial port, it's enough with a telephone cable serial. If it doesn't have USB port, you must convert to USB, it's required a USB-serial cable or a PCMCIA adapter or with another adapter with the same functionality. See figure A.1 for an example of Chronopic1 connection.

Serial Chronopics use 4.5 to 6 volts feeder. Is possible the purchase of a conventional power supply (which is connected to a power source) or create a homemade feeder with 3 x 1.5 volts batteries. This option provides the field tests in Chronopics serials.

With old Chronopics series, the battery connection should automatically turn the light on even if the Chronopic isn't connected to any computer. This is a good test to know if the power is working.

Figure A.1: Chronopic2-USB.

Figure A.2: Chronopic2-Serial.

If it doesn't work, is recommended to connect the power to the Chronopic and verify that the light is on (no need of computer) If the light doesn't turn on, this mean that the failure is in the Chronopic or in the feeder. Try this again with another feeder or Chronopic to determine the origin of the failure. The feeder should be between 4.5 and 6 volts. Some feeders have two polarities, ask the seller and connect with the correct polarity.

A.3   USB and serial ports

Chronopic should be connected to the contact platform and the computer. PC connection is via port as shown in Table A.1.

Currently, most laptops do not have a serial port, so the USB port is required by most users. Users without serial port should get a pcmcia card or similar type to add serial port to the computer. The latest and favorite choice is to get a USB-serial cable. In many cities it's difficult to find these cables in stock if they haven't been previously requested. Another option is to buy them online.

The operating system assigns names to ports, as shown in Table A.2.

Operating system	Port	Name
MS Windows	Serial	**COM1** or COM2
MS Windows	USB	COM1, COM2, COM3, ... (seen to COM27)
GNU/Linux	Serial	**/dev/ttyS0** or /dev/ttyS1
GNU/Linux	USB	**/dev/ttyUSB0**, /dev/ttyUSB1

Table A.2: Names of each operating system port.
The most common names are in bold type text.

The plate-USB Chronopic2 may require a driver if Windows is not able to detect it. Windows should automatically assign a name (COM1. COM8 ..) to the USB port connection, but in many Windows installations this process is not completed therefore it's required the driver (According to the manufacturers is not necessary the cable because is automatically detected). Therefore is recommend to download a USB-serial driver: `http://www.serialgear.com/wd_pl2303h-hx-x_v20019v2021.zip`, or any other provided by the manufacturer or obtained by the network looking for "USB-serial driver ".

A.4   Chronopic3 assembly process (initial units)

Chronopic was initially distributed in two parts: the circuit and the elements that made up the box: methacrylate, screws and washers. Figure A.4 shows the assembly. Note: These instructions are only necessary for the first step of the assembly process. The latest Chronopic versions are fabric build.
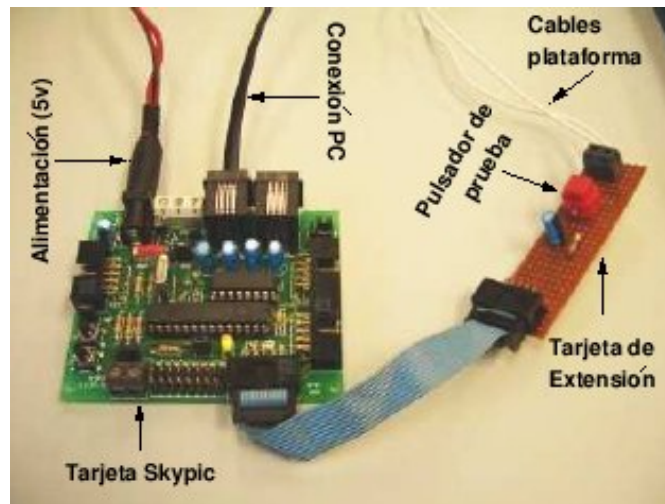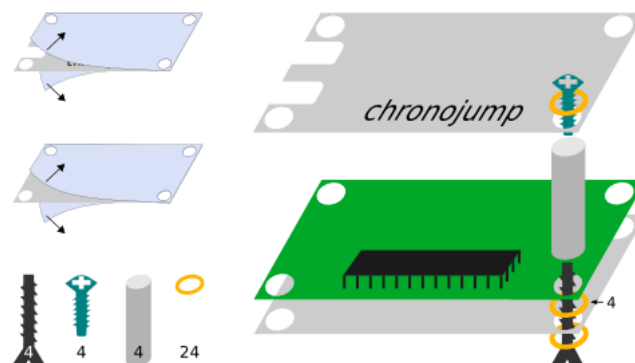
Figure A.3: Chronopic1.

Figure A.4: Chronopic3 assembly process (initial units).