

Diagnostics of personality accentuations

Software

Manual

PsyAccent version

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1 Introduction

Welcome to the **VibraImage** World! Thank you for your purchase of **PsyAccent** system. This Manual is written to help you enjoy **vibraimaging** and open new features in your abilities!

VibraImage technology measures micromovement (micro motion, vibration) of person by standard digital, web, IP or television cameras and image processing. Human head microvibration is linked with the vestibular-emotional reflex (VER) of a person and indicates emotion status and personality traits. **PsyAccent** system detects personality accentuations, calculating psychophysiological response to the presented stimuli by the control of three dimensional (3D) head-neck movements, accumulated as frame difference in several video frames. **PsyAccent** program is based on vibraimage technology and psychological tests accentuations of personality.

The question of borderline mental disorders diagnostics is one of the central problems of psychiatry and psychology, as well as its separate branches: forensic medical examination, special and clinical psychology, etc. This issue was raised quite sharply in connection with the specification of diagnostic criteria of extreme norm of character manifestations.

Under what conditions does the extreme norm become a pathology? Law enforcement officers, psychiatrists, psychologists and social workers are well aware in practice that certain mental disorders often cause serious crimes.

"Accentuation" is traditionally understood as the extreme version of the norms of character manifestation. The term "accentuated personality" first appeared in the works of [Karl Leonhard](#) (1968): "accentuation is, in essence, the same individual traits, but having a tendency to transition to a pathological state." In Leonhard's model, the accentuation of personality is a broad concept that includes character and many other components of a person's social activity. Leonhard examined mainly people of mature age, who, because of a certain life experience, the personality has already formed.

For teenagers (underage children, also are allowed) the model of [Lichko](#) (1985) is preferable: "accentuations of character is the extreme version of the norm, in which individual traits are excessively amplified, which leads to selective vulnerability to a certain kind of psychogenic influences with good or even increased resistance to other influences".

Narrow problems of palliative psychology in the aspect of psychological compatibility accentuations of character between patient and doctor are covered in the works of Gnezdilov A.V (1995).

Different conceptions of personality accentuations (Leonhard, Lichko, Gnezdilov) requested different questionnaires for personality accentuation testing.

1.1 Basic applications

The **PsyAccent** is the program for detection of personality accentuations profile for any person in different age groups during psychophysiological testing. Identification of the main

character traits, risk group of personality deformities and behavioral disorders, potential compatibility between different carriers of personal accentuations.

Psychophysiological system **PsyAccent** targets the following:

- diagnostics accentuations of character;
- testing the risk group of dangerous personalities (of borderline states);
- research and measurement of psychophysiological and emotional states of a person;
- research and ranking of psychophysiological responses to presented stimulus.

The software and a hardware form a **PsyAccent** system.

Program **PsyAccent** offers several questionnaires for detection of the profile personal accentuations:

L12 questionnaire intends to identify for adults (developed with reference to the concept of K. Leonhard). The program allows identifying the profile of the distribution of personal accentuations, indicating the main features and potential compatibility between different carriers of personal accentuations

T12 - questionnaire intends to identify for teenagers and young men (developed with reference to the concept of A.Y. Lichko). The program allows to identify the profile of the distribution of personal accentuations, the main diagnostic criteria (main features) and variants of pathological dynamics (risk group of mental disorders and behavioral disorders) for each type of accentuation.

PA - to determine the psychological compatibility between the patient and the doctor (developed with reference to the concept of A. V. Gnezdilov).

1.2 Specifications

User must have the hardware with the following parameters:

1.2.1 Basic parameters

- | | |
|---|-----|
| • Resolution, TVL, more than | 400 |
| • Noise level of vibraimage, bit, less than | 0,1 |
| • Frame speed, FPS, not less than | 25 |

1.2.2 Digital (web) camera requirements

- | | |
|--------------------------------|-------------------------|
| • Resolution, pixel, more than | 640 x 480 |
| • USB compatible | USB 3.0, USB 2.0. |
| • Frame speed, FPS, more than | 25 |
| • Exposition control | automatic and manual |
| • Color mode | color and B/W switch |
| • Flicker mode | Flicker 50 Hz and 60 Hz |

1.2.3 System requirements for local module computer

• Operation System	Windows 7/8/10 or later 64-bit only
• Processor	Intel I3 or higher
• RAM	more than 4 Gb
• HDD	more than 10 Gb free space
• USB port	1 free USB ports version USB 2.0
• Installed software	Microsoft Office Excel 2010 (64-bit only) and higher
• Video capture	WDM-compatible video device

1.3 Package contents

1	PsyAccent software	-	1
2	Activation code or guardant dongle	-	1
3	User's manual	-	1
4	Digital USB camera (hardware)	-	1 (option)
5	Microphone (hardware)	-	1 (option)
6	Personal computer (hardware)	-	1 (option)

Attention!

Hardware with the specified parameters is not included in the delivery. User gets the hardware for the **PsyAccent** system themselves.

It is recommended to use Microsoft LifeCam Cinema webcam or similar with parameters not worse than this webcam.

2 PsyAccent software installation

It is necessary to execute the following actions for installation of **PsyAccent** program on your computer:

1. Go to Web page <http://www.psymaker.com/support/downloads/>
2. Download file [http://www.psymaker.ru/downloads/ PsyAccent.exe](http://www.psymaker.ru/downloads/PsyAccent.exe)
3. Run file PsyAccent.exe from archive file.
4. Select language for installation procedure.
5. Press button «Next» in the appeared window of the beginning installation.
6. Accept the license agreement and to press button «Next» in the appeared window.
7. In the appeared window, specify a way to the catalogue where files of the program will be written down, then to press button «Next».
8. Press button «Next» in the appeared window, allows installation of software files on your computer.
9. Press button «Install» at the start of installation.
10. Press button «Finish» at the end of installation.
11. **PsyAccent** program icon appears after the end of installation in system menu on desktop of your computer.
12. To reboot a computer.

2.1 PsyAccent software activation

1. Procedure of activation is done once at the first start of the program.
2. Before the program activation it is need to buy this version of the program in the online store Psymaker <http://www.psymaker.com/store/>
3. Activation procedure requests access to the Internet for receiving answer code from server.
4. Activation code has the structure shown in the table.

Activation code	Program version
VIXX_XXXXXX_PA	PsyAccent is psychometric program for detection of talent profile, aptitude and abilities.

5. Program also supports dongle protection with the special PA or PRO dongle.

2.1.1 Standard activation

1. For the activation beginning it is necessary to run the **PsyAccent**.

2. At the first start of the program the activation window will be displayed (Fig. 2.1).

The image shows a Windows-style dialog box titled "VI Key". It contains three text input fields: "Request" (empty), "Code" (containing the alphanumeric string "AA11-3469-CC65-CB93-1A26-F79C-26CE-14E7-931B-C680"), and "Answer" (empty). Below these fields is a button labeled "Get Answer code using HTTP". At the bottom of the dialog are two buttons: "OK" and "Cancel".

Fig. 2.1. Activation window

3. In the field «Request» it is necessary to enter the activation code received by e-mail or specified by the seller (Fig.2.2).

This image shows the same "VI Key" dialog box, but the "Request" field now contains the text "PSYMAKERCOM_2DBEA9B86436C93357B34FE753AED760_LD". The "Code" field remains the same, and the "Answer" field is still empty. The "Get Answer code using HTTP" button and the "OK" and "Cancel" buttons are also present.

Fig. 2.2. Putting activation code.

4. After input of activation code to press the button «Get Answer code using HTTP».

Attention!

Please, be careful and paste code without additional gaps!

5. The activation code will be checked up through the Internet and, in case of successful end of activation procedure, the answer code will be sent (Fig. 2.3).

6. Press button «OK». **PsyAccent** automatically started.

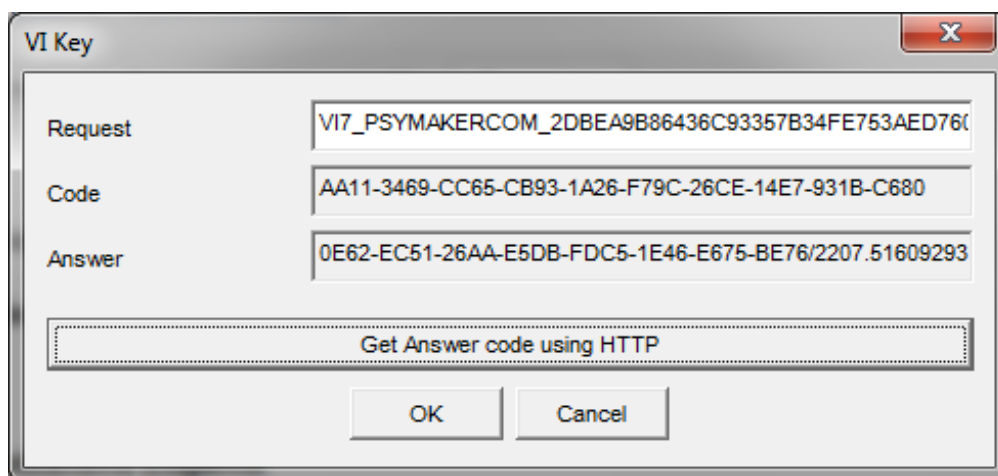


Fig. 2.3. Successful activation.

2.1.2 DEMO activation

1. For the activation beginning it is necessary to run the **PsyAccent** program.
2. At the first start of the program the activation window will be displayed (Fig. 2.1).
3. In the field «Request» it is necessary to enter «DEMO_PA» (fig. 2.4). After input of activation code to press the button «Get Answer code using HTTP».

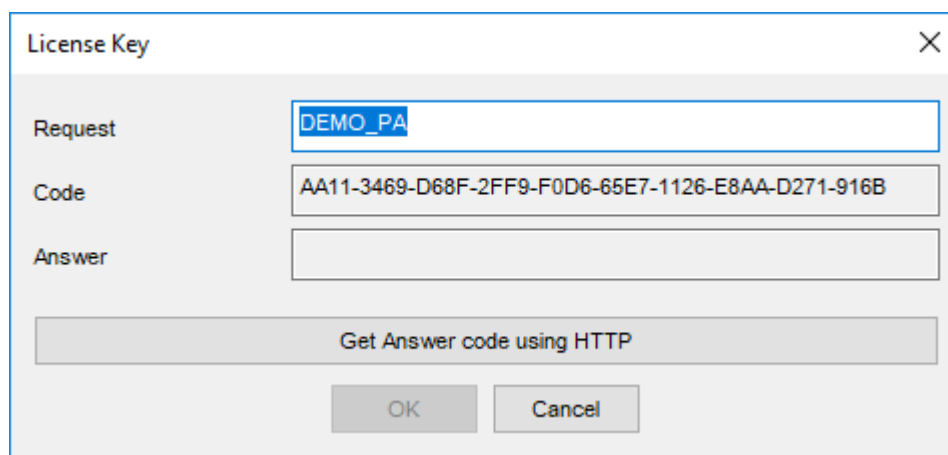


Fig. 2.4. Putting DEMO activation code.

4. The activation code will be checked up through the Internet and, in case of successful end of activation procedure, the answer code will be sent (Fig. 2.5).

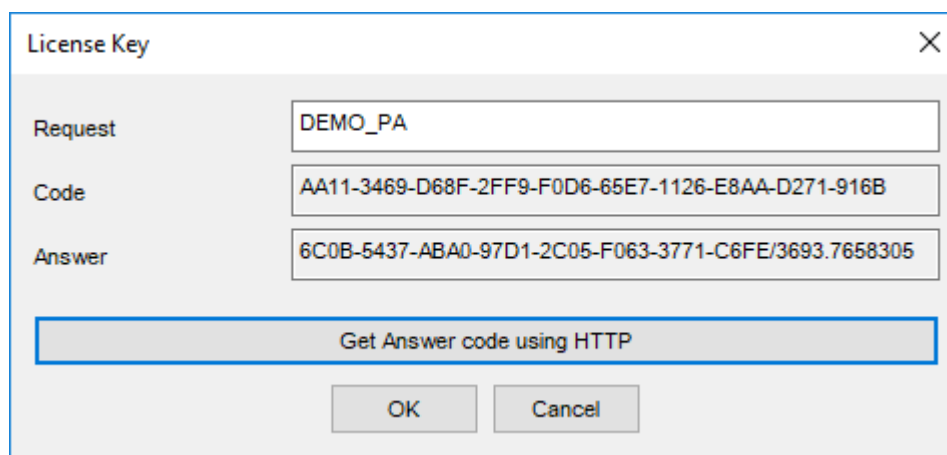


Fig. 2.5. Successful DEMO activation.

5. Press button «OK». **PsyAccent** will be automatically started in selected version.

2.2 Reinstallation of PsyAccent

Note, it is recommended to uninstall the **PsyAccent** program before any upgrade software or hardware on PC and to reinstall after this upgrade.

For this purpose, it is necessary to execute the following actions:

1. Connect to the Internet a computer on which one of **PsyAccent** has been installed.
2. Start **PsyAccent** program for reinstallation on a new computer.
3. In the menu «**Help**» (Fig. 2.6) choose item «**About Vibraimage...**» (Fig. 2.6).

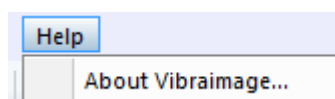


Fig. 2.6. Menu «Help»

4. In the opened window press the button «**Unregister key**» (Fig. 2.7).
5. Close the program.
6. Connect a new computer to Internet.

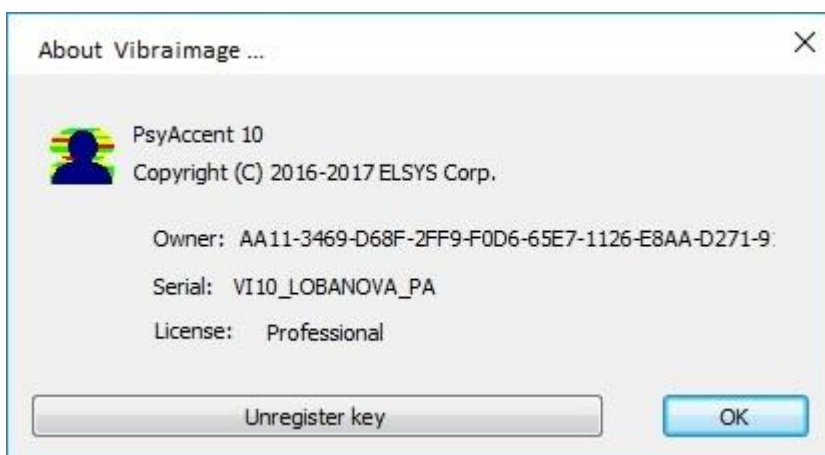


Fig. 2.7. Information about the program.

7. On the new computer install the program and make registration of an «old» modification activation code through the Internet, according to recommendations of section 2.1.
8. After successful program registration the given activation code will be fixed to the given computer.

2.3 First start of **PsyAccent**

After starting program you will see white screen (Fig. 2.8). For camera selection in program it is necessary to click the right mouse button and to select the camera from the appeared submenu «Video» in menu «Settings» (Fig. 2.9).

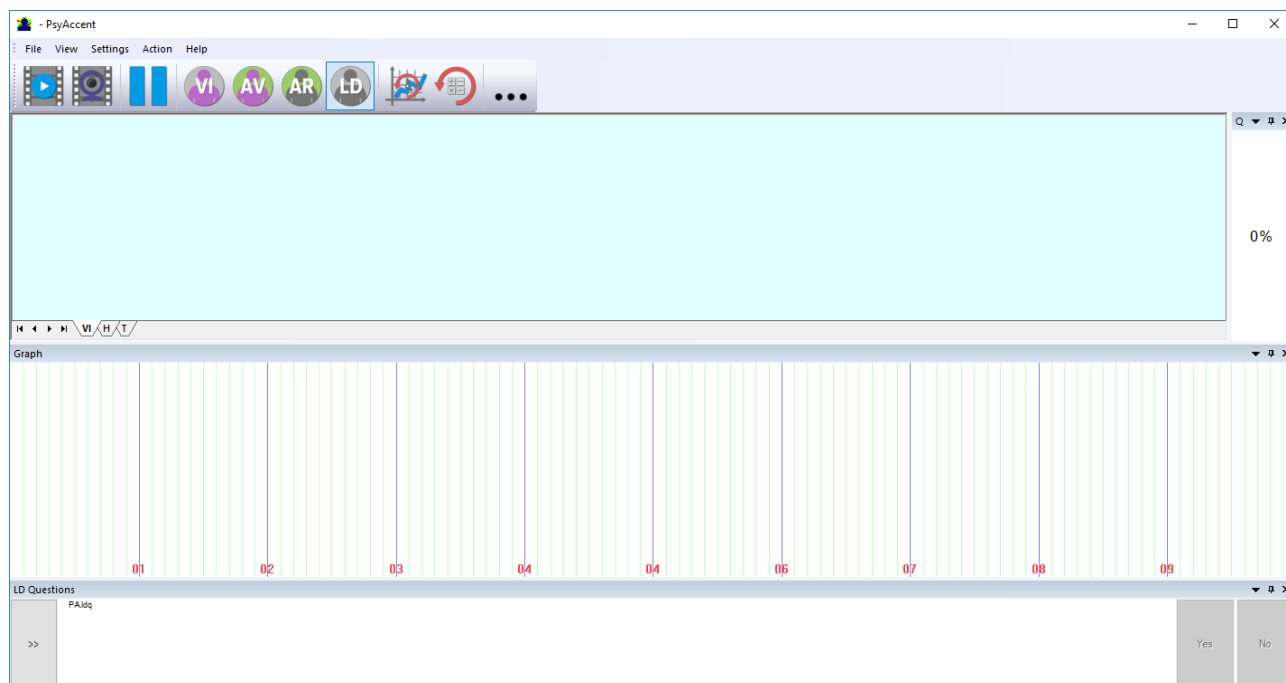


Fig. 2.8. The first start of the program. The camera isn't connected.



Fig. 2.9. Connection of the camera.

2.4 Camera's setting

Standing correct camera settings is very important operation for the next vibraimage processing, because mistakes in image quality have great influence to the vibraimage processing results.

2.4.1 Video camera choice

It is necessary to select in the main menu «**Settings**» => «**Video**» => «**.../name used camera/...**». In figure 2.7 the process of selecting camera «Microsoft LifeCam Cinema» is shown. If the camera is connected, selected and works, then on the left of the name there will be an icon «**✓**» (Fig. 2.10), and the menu will be extended with the «**Video capture filter...**» and «**Video capture format...**».

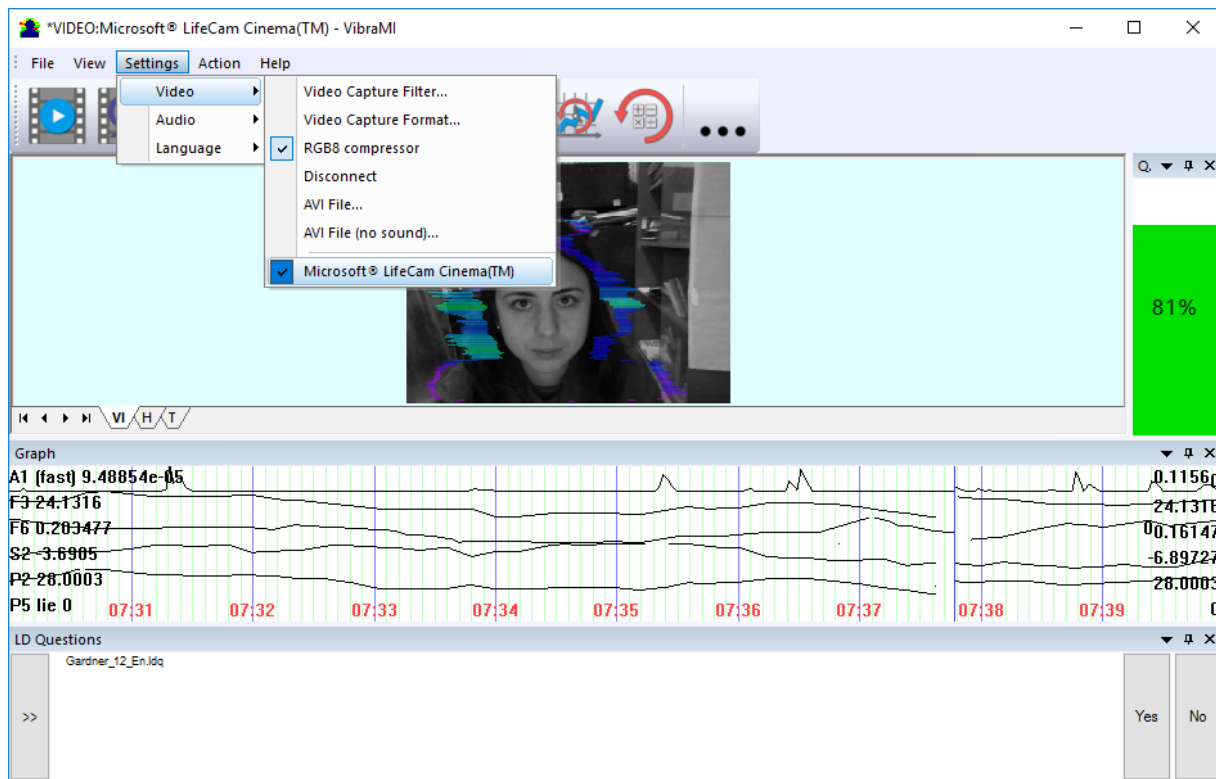


Fig. 2.10. Example of camera choice.

VibraMI system allows to processing as the «alive» video signal acting from a video camera, and the video data, before written down and saved as an AVI-file. On default the system works with a signal from a video camera. Subitems «**AVI File ... F3**» and «**AVI File (no sound)... Ctrl+F3**» are intended for a choice for the analysis of an external videofile.

2.4.2 Video capture filter

Select «**Video capture filter.....**» in the submenu «**Video**» (Fig. 2.11) for open menu of the camera settings. Item «**Video capture filter...**» appears in the menu only in case of the correct installation of camera drivers and correct choice of operating camera.

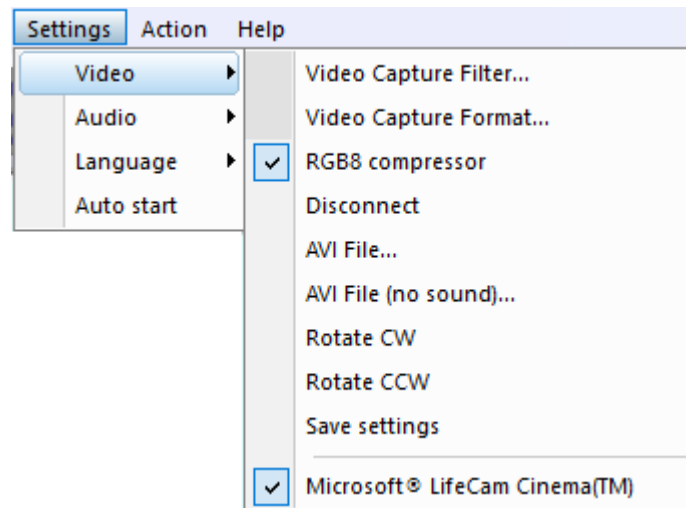


Fig. 2.11. Opening of the camera's settings menu («Video capture filter...»).

After a choice of the «**Video capture filter...**» the window «**Settings**» will open. Settings window differs depends on camera type. The first tab of this window is usually devoted to the image setup (Brightness, Contrast, etc.). In a figure 2.12 the window «**Settings**» for the camera «**Microsoft LifeCam Cinema**», and in a figure 2.13 for the camera «**Look 1320 V2**» is shown. Camera Microsoft LifeCam Cinema has low noise level and is preferable for vibraimage applications among webcams.

When adjusting the camera settings, you must fulfill the following general requirements:

- The «**Brightness**», «**Contrast**» and others parameters should be configured so that the image of the object was the maximum contrast.
- Switch on «**Flicker**» mode for setting lighting power line frequency (repayment flicker), in most countries it is 50 Hz.
- If your camera supports, then switch on the black-and-white image «**B/W mode**». If the camera works only in color mode, it is recommended to set «**Saturation**» parameter to minimum value.
- Depending on the experimental conditions and light to use automatic or manual setting «**Exposure**» parameter. If constant lighting, it is recommended to use the manual adjustment. If changes (for example, an object depends on the lighting street lighting), it is better to use the automatic adjustment mode setting.
- Parameters «**Zoom**» and «**Focus**» is recommended to use in the manual mode and change their values not due to electronic image processing, but by approaching/removing the camera from the object.

Depending on the experimental conditions and light it is necessary to select auto or manual settings «**Focus**», «**Exposure**». If the illumination is constant, then it is recommended to use manual configuration, if illumination is changed (for example, the illumination of an object depends on street lighting), it is better to use automatic configuration. The «**Scale**» (Zoom) is recommended to select based on two factors. Firstly you need to have maximum image size of control object and it is preferably to stand maximum zoom level. From the other side high level of electronic zoom in some cameras could go down the frame rate and it is necessary to control this parameter and fixed frame rate more than 25 fps. So for webcam Microsoft LifeCam Cinema the optimal meaning of zoom for personal control is 4, see fig. 2.14. For other cameras it is possible to adjust other optimal zoom settings.

Note, program settings are set by default at each new turn on the camera. If the video conditions don't change it is recommended to save your settings using item «**Save Settings**» from the submenu «**Video**» (Fig. 2.11).

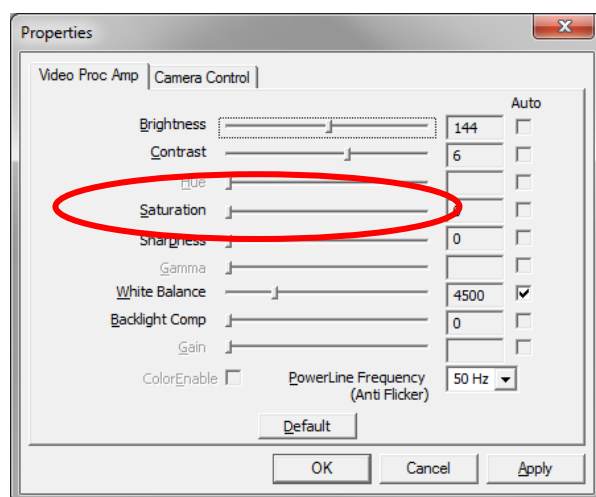


Fig. 2.12. Video setting, camera « Microsoft LifeCam Cinema»

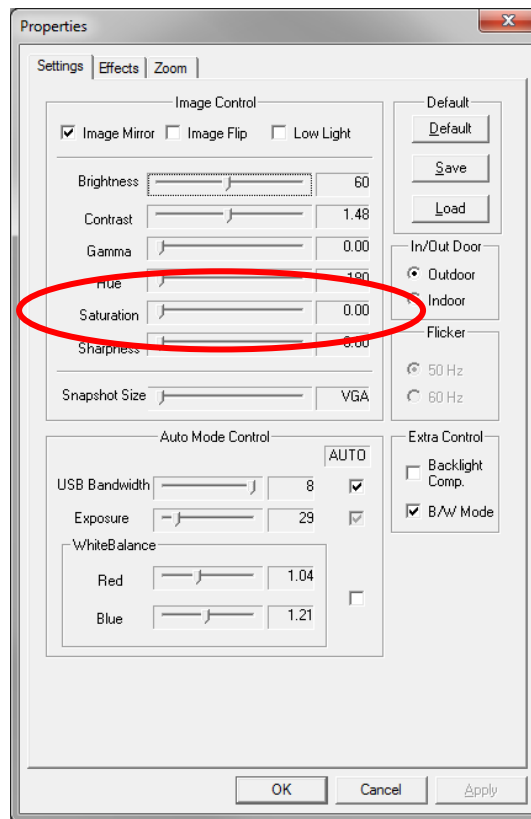


Fig. 2.13. Window «Settings», video setting, camera «Look 1320 V2»

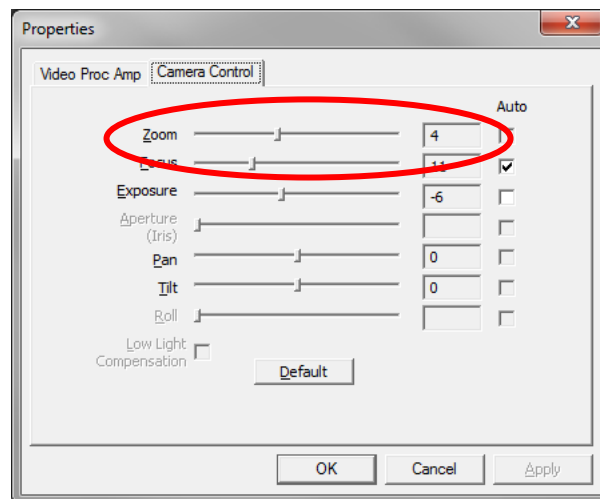


Fig. 2.14. Zoom setting, camera «Microsoft LifeCam Cinema»

2.4.3 Video capture format

Select «**Video capture filter...**» in the submenu «**Video**» (Fig. 2.11) for open menu of the camera settings. Item «**Video capture format...**» appears in the menu only in case of the correct installation of drivers of the camera and a choice of the working camera. Frame rate is necessary to set 30 and the frame size to set («Output Size») not less than 640 x 480 px (Fig. 2.15).

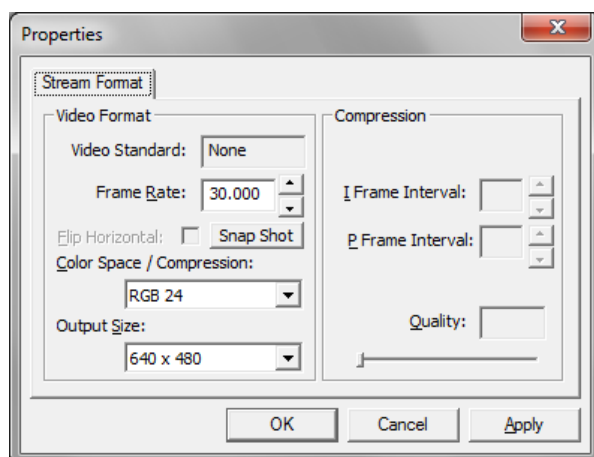


Fig. 2.15. Window «Video capture format»

Note, after changing camera settings in the program **VibraMI** frame rate «In» must be in the range of 25 – 30 FPS.

2.4.4 Checking the settings on the test table

During the first start of Vibraimage system and periodically it is recommended to test image quality by the test table. It is required to place a test pattern opposite to the camera so that the image of the table occupies the entire space of the frame. To achieve the optimal contrast range of object is need to stand in camera settings auto regulation of illumination in case of unstable illumination (Fig. 2.16) and manual regulation of illumination in case of a constant illumination (Fig. 2.17). The inscription «Warning! Low quality (1)» in the upper left corner of the image is normal, because there is no a person's face on the video.

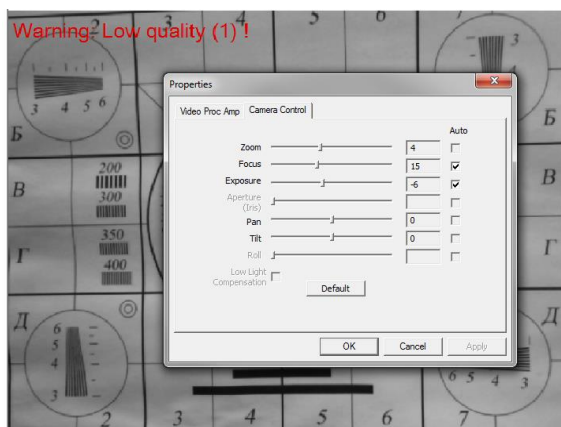


Fig. 2.16. Checking the camera settings on the test table, automatic regulation of the exposure (mode is recommended for unstable object illumination).

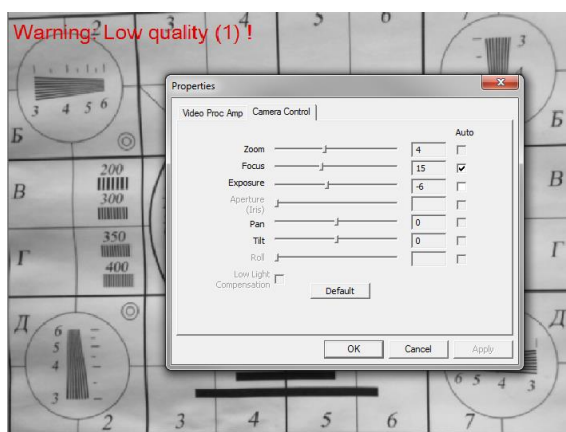


Fig. 2.17. Checking the camera settings on the test table, manual regulation of the exposure (mode is recommended for stable object illumination).

2.4.5 Video quality auto checking function

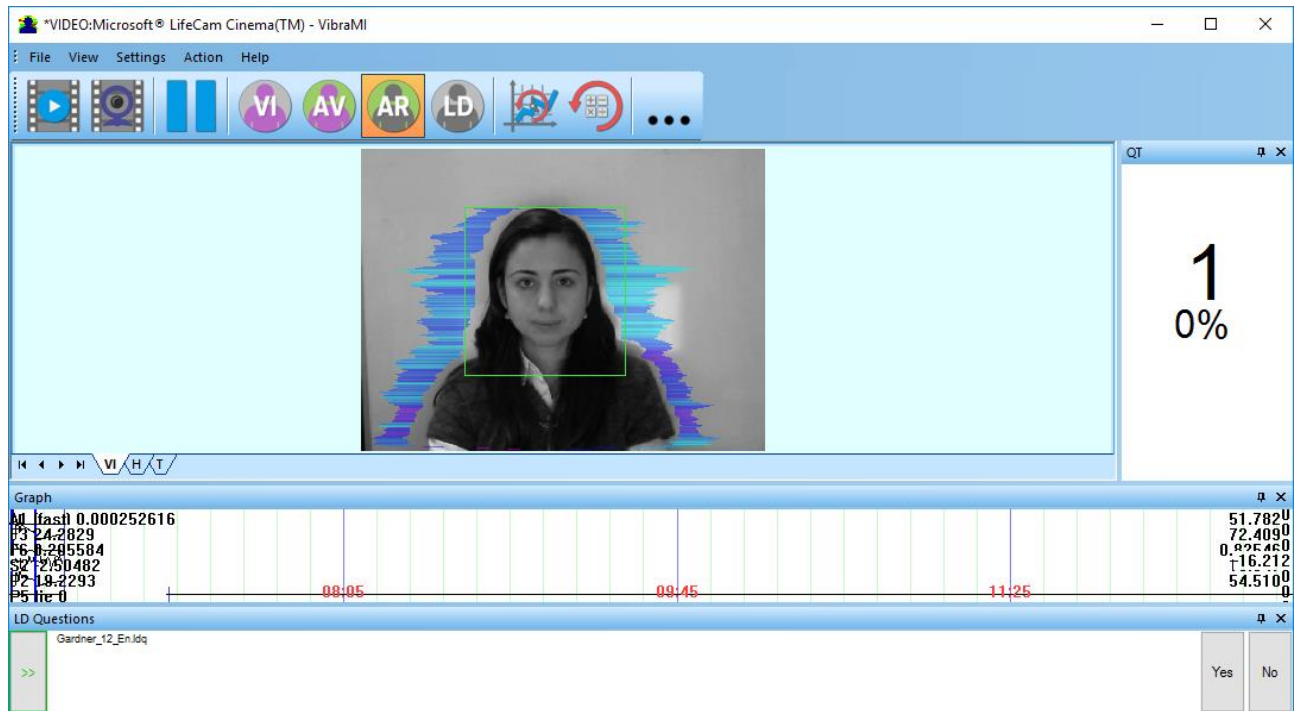
The program **VibraMI** has auto checking function and image quality control during the test. Because the definition of human reaction occurs on the video, the quality control of the processed video is necessary to get the right test result. Program gives error indication in left upper corner (Fig. 2.18) of image area if the image quality is lower than standard vibraimage requests:

Error 1 – indicates when facial image is lower than necessary. For cancel this error is need to move checked person near to camera or start zoom function on camera (Fig. 2.18).

Error 2 – indicates when camera noise level is higher than necessary. The reason of this error could be low illumination, incorrect camera settings or camera vibration (Fig. 2.19).

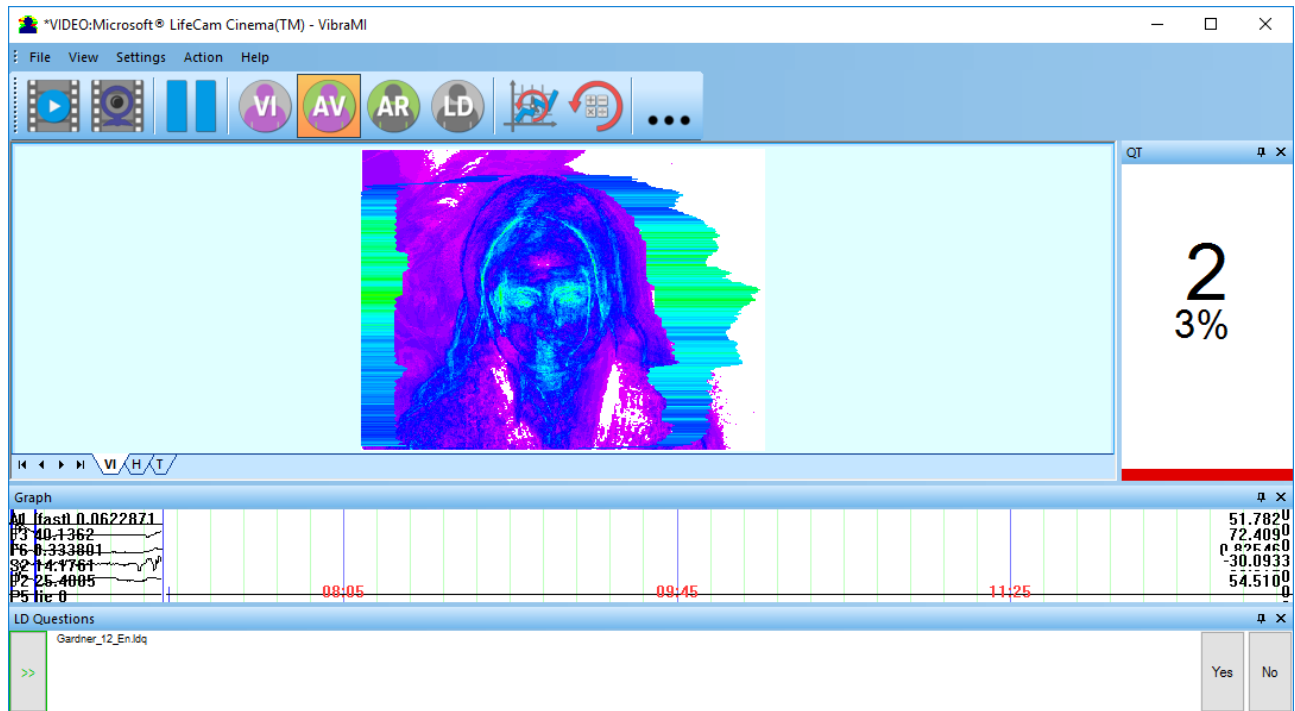
Error 3 – indicates when computer input frequency rate is lower than necessary. Requested norm for processed frame frequency is more than 25 FPS. This errors indication was done for deleting unqualified staff influence during results control (Fig. 2.20). Modern web cameras via USB 2,0 interface provide input at 30 FPS when the input format is 640 x 480 px.

Note, before the start of the test should ensure that the program processes image of a person without any errors.



*Fig. 2.18. An example of an error message (1) at a low image quality.
Head image size is lower than requested.*

Head image size in the elements (pixels) determines the accuracy of recorded vibration and requires permanent control during the test. When tested with a video image analysis there are no strong restrictions on the movement of the test person, as required the contact polygraph. Thus, the person feels natural, which increases the accuracy of test results. However, the natural behavior can lead to the fact that the person during the response will deviate from the camera and the head image size becomes less than required. To resolve this problem vibraimage system continuously monitors a person's head size of the image and displays an error message (1) in the case of reducing the size below the limit. In addition, vibraimage program includes a permanent face detection algorithm, which ensures elimination of errors from a lack of a real image of the person in the frame during testing.

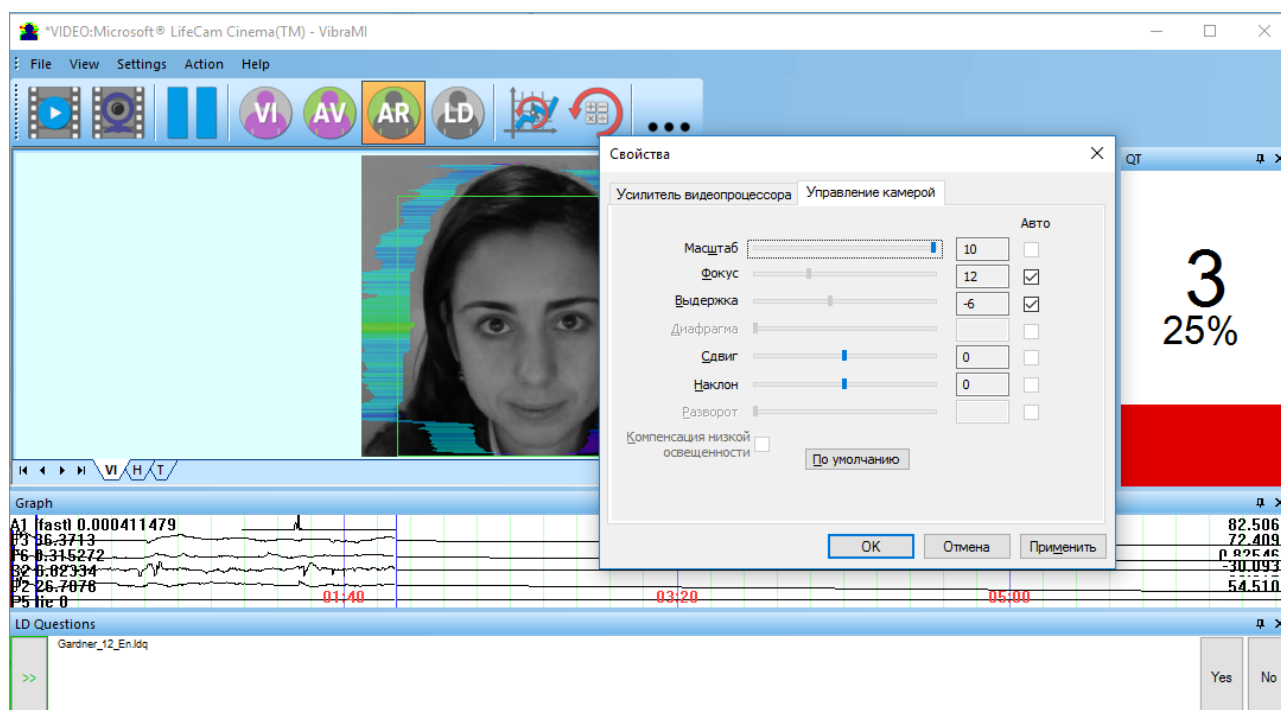


*Fig. 2.19. An example of an error message (2) at a low image quality.
Camera vibrations is strong and on the image there is a noise.*

The figure 2.19 shows an example of strong camera vibrations. For good vibraimage you should mount the camera on a fixed support so that the vibration of the support was minimal. If the camera is mounted on a table, while working with the program you should not lean on the table.

The noise of the signal from the web-camera includes a video camera noise and illumination instability and it can significantly affect the test results. Continuous calculation of the noise level should be carried out by methods similar to the measurement of the noise from the photodetector of the television camera. In this case, when you exceed the noise threshold, the system automatically displays an error message (2) (Fig. 2.19).

This error also appear when illumination is instability.



*Fig. 2.20. An example of an error message (3) at a low image quality.
Camera vibration*

Despite the fact that the television camera may transmit 30 FPS with the given resolution, it does not guarantee that the computer receives and processes the incoming video data in real time. However, any deviation from the information processing in real time results to loss of information and to reducing the reliability of the test. By reducing the input and processing actual frequencies frames below the set limit, the system automatically displays an error message (3) (Fig. 2.20).

In this situation, it is necessary to reconfigure parameters of the camera («**Brightness**», «**Contrast**», et al.) to increase the frame rate. For web-camera Microsoft LifeCam Cinema that happens in the case of zoom in the maximum, as shown in figure 2.21. In the case of reducing zoom should control the frame rate in the menu «**Video Capture Format ...**» (Fig. 2.15).

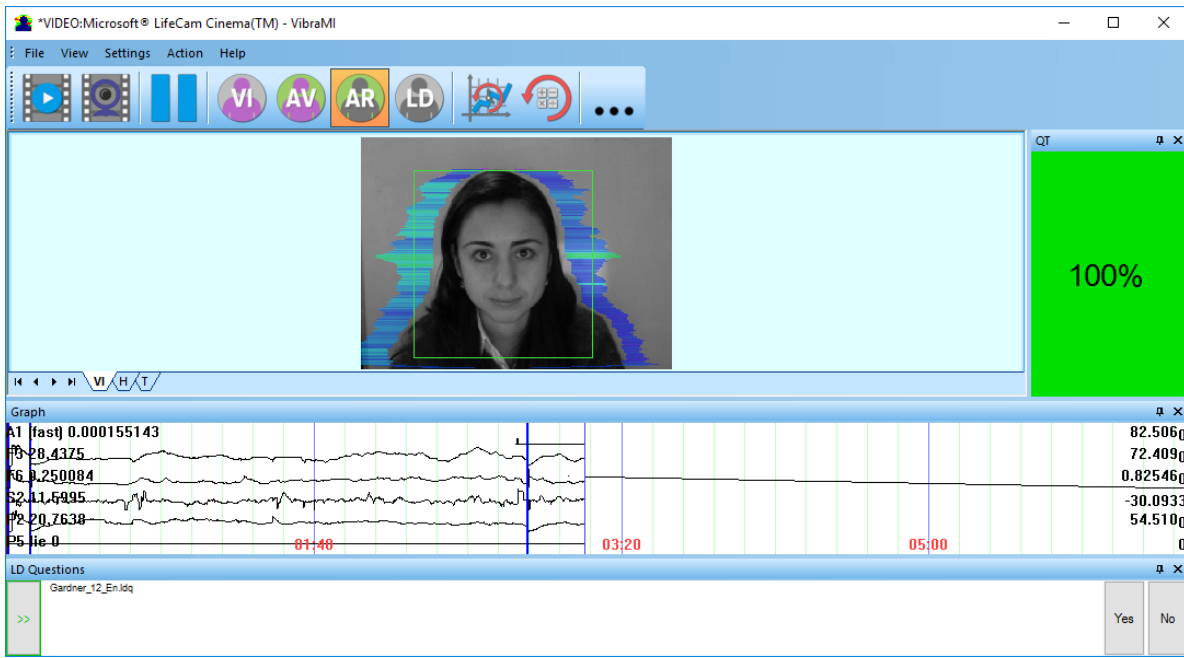


Fig. 2.21. An example of a quality column operation. Head image size and other parameters are correct.

Quality column shows time % during the testing when image quality is equal 100 %. When we have quality indication 88 % (fig 2.22), that means 88 % of testing time image quality hasn't errors and 12 % of testing time image quality includes errors with the number 1 or 2 or 3.



Fig. 2.22. Quality test shows 88 %

Pressing button R reset image quality to the beginning 100 %. In lie detection mode and M mode image quality is very important and testing with image quality lower 80 % could not be acceptable for processing.

3 PsyAccent. User's manual

After start of **PsyAccent** and connection of the video device (Fig. 3.1) in the main window there is an image from connected video device.

3.1 Main window

Main window (Fig. 3.1) consists of the following parts:

1. main menu;
2. image area;
3. questionnaire panel;
4. tools panel;
5. name of running VibraImage module, model of video source (Video camera model or AVI file name) & type of video source (Video camera or AVI file);
6. quality test column;
7. image menu



Fig. 3.1. Main window **PsyAccent**.

The program for the user's convenience have the ability to change the style of the main elements of the working window. To change the style, use the submenu «**View**» - «**Application Look**» (Fig. 3.2).

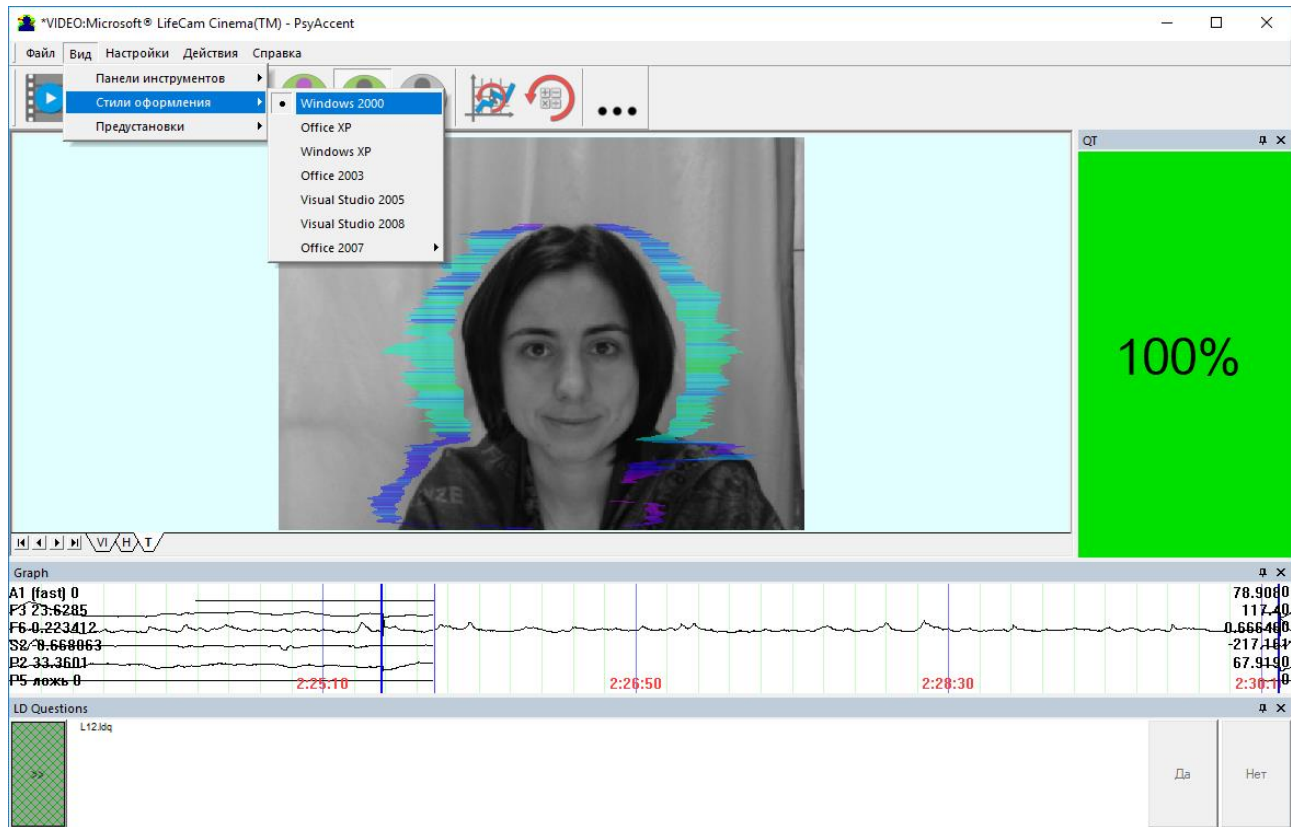


Fig. 3.2. Main window with style Windows 2000

3.1.1 Basic window design

In total in the main window of the program in addition to the video area, you can see an additional 7 windows that display information about the parameters of mental and emotional state of a person, and program settings (on fig 3.1 the windows labeled corresponding numbers):

1. File, View, Settings, Action, Help – main menu;
2. Images window for displaying vibraimages (VI), result's histograms (H), information-energy graph (T);
3. Toolbar – main toolbar;
4. LD questions – window for show questionnaire's questions
5. Graph – window with changing main parameter (by default A1 (fast), F3, F6, S2, P2, P5 lie);
6. QT – image quality window (quality test).

User can add or delete windows by submenu «**View**» - «**Toolbar**» (fig. 3.3).

Note, double click by the left button of a mouse in the image field of makes **RESET** of all saved up information and statistics about frames and start new cycle collection of information.

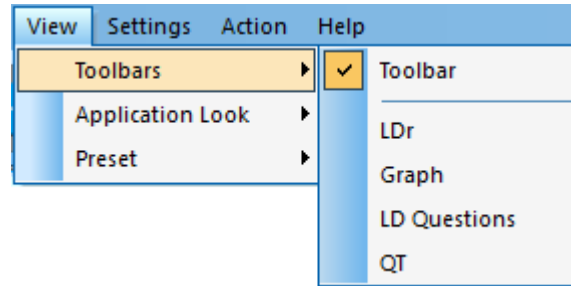


Fig. 3.3. Submenu «Toolbars»

3.1.2 Program windows position control

The user can control the placement of additional windows on the screen and the size using the controls elements on the left side of each window title. For each window it is available control menu (fig. 3.4). This menu also appears when you click the left mouse button in finding the mouse pointer in the desired window. In «Docking» mode, window position and size are fixed, and when opening/closing the window will open in a given position. The mode «Floating» window position and size can be changed by the user.

If the window is in a random location on the screen, then double-click the left mouse button on the window, the window will move on the screen in the «default» position.

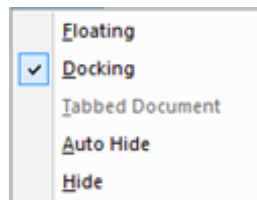


Fig. 3.4. Window control menu

Each window can be closed, or by using the window menu or by using a separate control element (fig. 3.5).

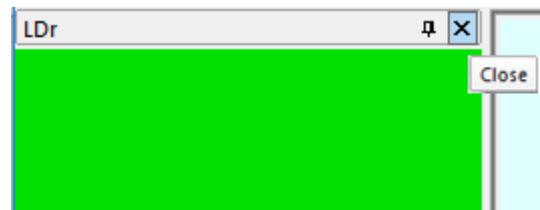


Fig. 3.5. Control element «close window»

Each window can be temporarily minimized and moved to the border of the main program window (fig. 3.6). Figure 3.11 additional windows hidden and moved to the border of the main window and they icons are highlighted in orange color.

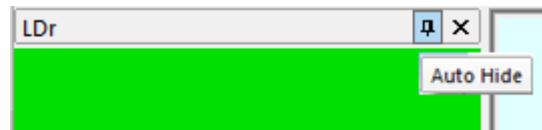


Fig. 3.6. Control element «Auto hide»

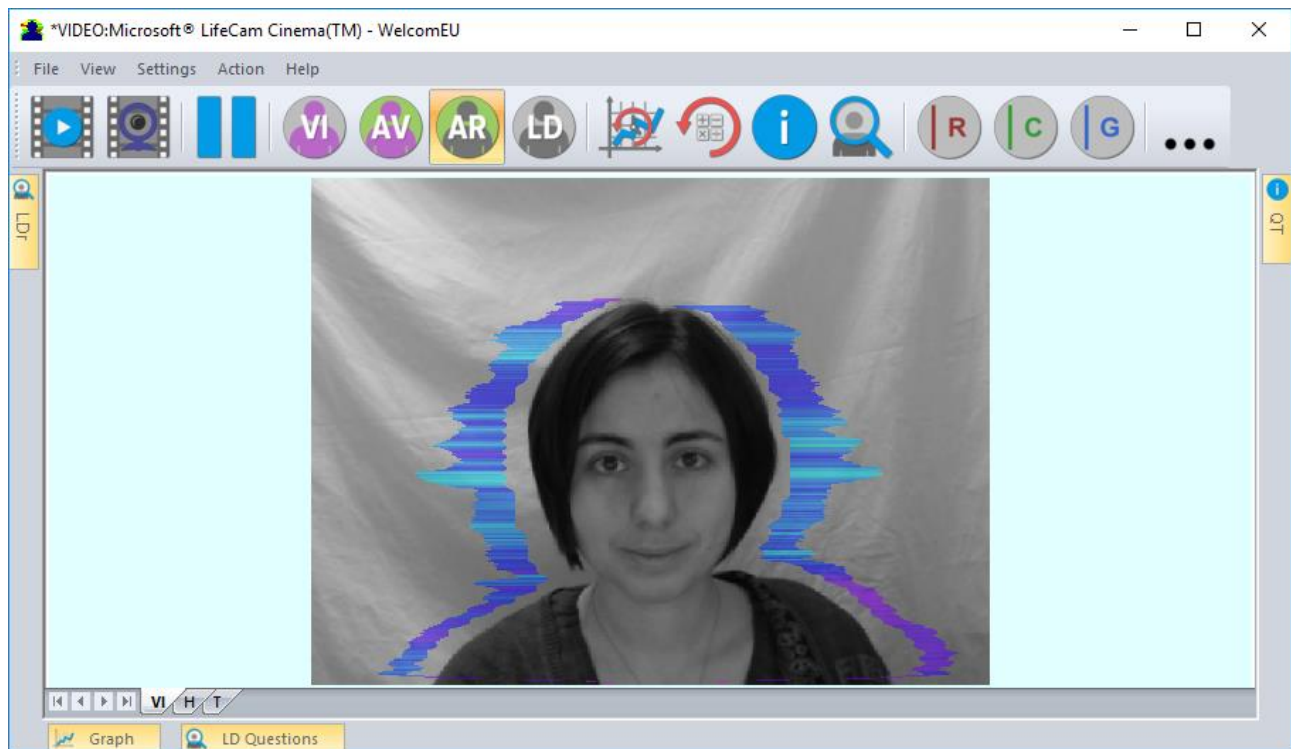


Fig. 3.7. All additional windows are hide.

3.2 Main menu

The main menu contains the following items:

- **«File»**
- **«View»**
- **«Settings»**
- **«Action»**
- **«Help»**

3.2.1 Menu «File»

Menu «**File**» (fig. 3.8) contains following items:

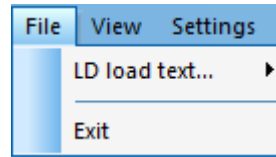


Fig. 3.8. Menu «File»

Item «**LD load text...**» – load questionnaire file with format «*.ldq»

Item «**Exit**» - exit from program.

3.2.2 Menu «View»

Menu «**View**» (fig. 3.9) defines visible in the basic window information and contains the following items:

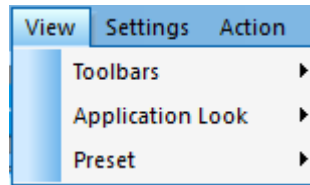


Fig. 3.9. Menu «View»

Item «**Toolbars**» - switch on/off the toolbar (fig 3.3).

Item «**Application Look**» - choose style of program (fig 3.2).

Submenu «**Presets**» menu «**View**» (fig. 3.10) intended to choice one basic mode in image area.

- In «**VI**» mode [«VibraImage mode»] displays vibraimage of person. Color for every image pixel depends on its amplitude or frequency of vibrations (fig. 3.11a).
- In «**AV**» mode [«Aura - Vibraimage mode»] the contour of the object allocated around the vibraimage. Vibra-aura line size depends on medium line vibration amplitude. Vibra-aura line color depends on maximum line vibration frequency inside vibraimage contour (fig. 3.11b).
- In «**AR**» mode [«Aura on the Real image»] the vibra-aura of the person is shown around his real image (fig. 3.11c).
- In «**LD**» mode [«Lie Detector mode»] image area shows real object image (fig. 3.11d).

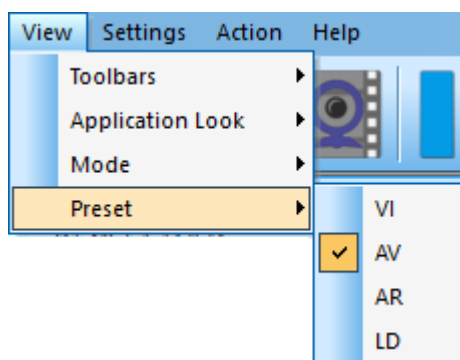
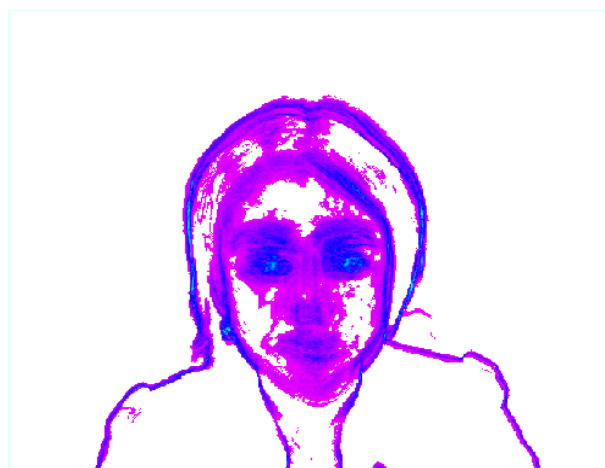
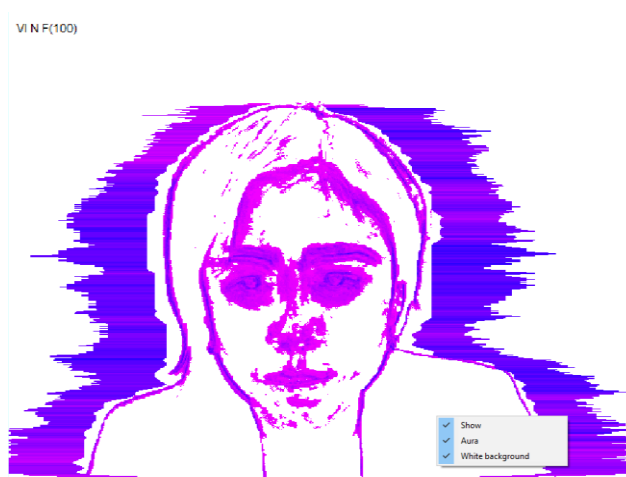


Fig. 3.10. Submenu «Preset»



3.11a Mode VI



3.11b Mode AV



3.11c Mode AR



3.11d Mode LD

3.11 Image area in different modes

3.2.3 Menu «Settings»

Menu «**Settings**» (fig. 3.12) allows choosing video or audio source, language and auto start program:

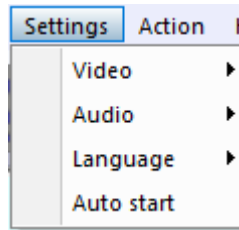


Fig. 3.12. Menu «Settings»

PsyAccent allows to process «live» video signal coming from a video camera and video data recorded before and saved as AVI-file. The system works with a signal from a video camera by default.

Submenu «**Video**» contains settings of video modes. It can differ depending on connected devices. For example, this menu contains the following items (Fig. 3.13). You can choose as video source one from many installing in PC video-devices or load external video file. Подменю «**Видео**» [Video] содержит команды, предназначенные для настройки входного видеосигнала. Нижние пункты меню позволяет выбрать используемое устройство захвата видеоизображения из нескольких, установленных на данном компьютере, или загрузить видеофайл. Submenu «**Video**» – video settings:

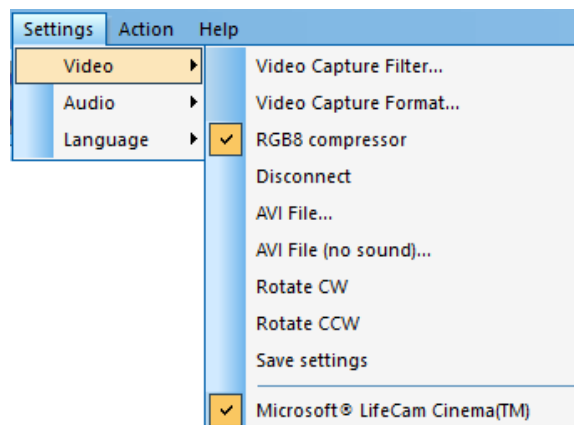


Fig. 3.13. Submenu «Video»

Subitem «**Video Capture Filter...**», «**Video Capture Format...**», «**Save settings**» - (see 2.3)

Subitem «**RGB8 compressor**» are intended for management of a videofile record format. If this item is chosen, that, for economy of a space on a hard disk, the videofile saved in a black-and-white format.

Note, for connection to system of network IP cameras (for example, in figure 3.5 CamIP RTSP Example) and adjustments of their parameters the additional software CamIP.exe http://www.psymaker.com/downloads/CamIP_installer.msi is used.

The settings of IP cameras procedure described in the manual of the program http://www.psymaker.com/downloads/CamIP_eng.pdf

Subitem «**Disconnect**» allows to disconnect all videocamera or videofile

Subitems «**AVI File...**» and «**AVI File (no sound)...**» [AVI File (no sound)...] are intended for selecting for the analysis of an external video file

Subitems «**Rotate CW**» and «**Rotate CCW**» allow allow to make turn of an input video image on 90 and 270 degrees before its processing in the **PsyAccent**.

Subitem «**Save settings**» allows to save current camera settings in the Windows registry in order to load them at next startup programs with this camera

Submenu «**Audio**» (Fig. 3.14) contains settings of audio modes. It is can differ depending on connected devices.

Item «**Audio Capture Filter...**» allows adjusting the microphone selected for operation (see items below).

Subitem «**Audio Capture Filter...**»

Item «**Disable audio**» cancel audio analysis.

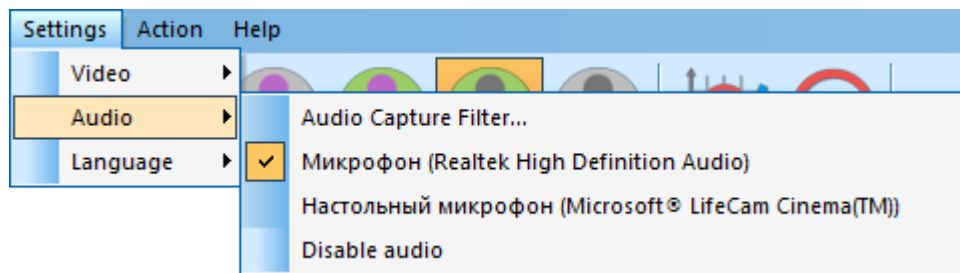


Fig. 3.14. Submenu «Audio»

Submenu «**Language**» allows to select interface language (See ch. 2.3).

The "**Auto start**" item is used to start the questionnaire automatically.

3.2.4 Menu Action

Menu «**Action**» (Fig. 3.10) contains following items:

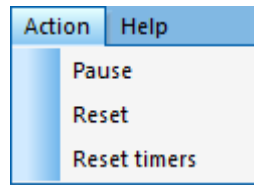


Fig. 3.10. Menu «Action»

Item «**Reset**» – reset all saved up information and statistics about frames and start new cycle collection of information.

Item «**Pause**» – stop last accepted frame of data in image area of windows.

Item «**Reset timers**» – reset to «0» all timers: video file timer, graph timer. The conclusion video and construction of graph begins all over again.

3.3 Tools and LD panels of PsyAccent. Questionnaire panel.

PsyAccent toolbar (Fig. 3.11) contains following buttons:



Fig. 3.11. PsyAccent toolbar.

All toolbar buttons (Fig. 3.11) duplicated the corresponding items in the menu system. When the tool tip determines the assignment of toolbar buttons. Note, the selected toolbar button is highlighted in color or volume, depending on the main window style.



– AVI files download for PDD analysis;



– live video camera connection;



– pause on image and program operations;



– choice of internal vibraimage mode (VI);



– choice of external vibraimage (vibra-aura) around internal video image mode (AV);



– choice of external vibraimage (vibra-aura) around real video image mode (AR);



– choice real video image mode (LD);



– reset timers and restart of testing;



– reset of all saved up information and statistics about frames and start new cycle collection of information;



– open the folder where you saved the images and measurement's data.

LD panel of **PsyAccent** program shown on fig. 3.12.

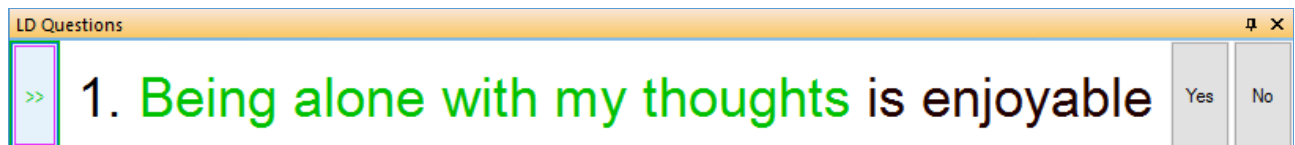



Fig. 3.12. LD bar. Starting of a questionnaire.

One-clicking on the button  on the LD bar let start a questionnaire at that moment. Double-clicking returns to the beginning of the questionnaire and the video file. The questionnaire can be selected by putting on the item «**LD load text...**» in the menu «**File**».

After the choice of the file, for example, PA_En (Fig. 3.13), the program passes into the mode of reading and visualization of a questionnaire. The person conducting survey reads the questions which are displayed in the karaoke mode.

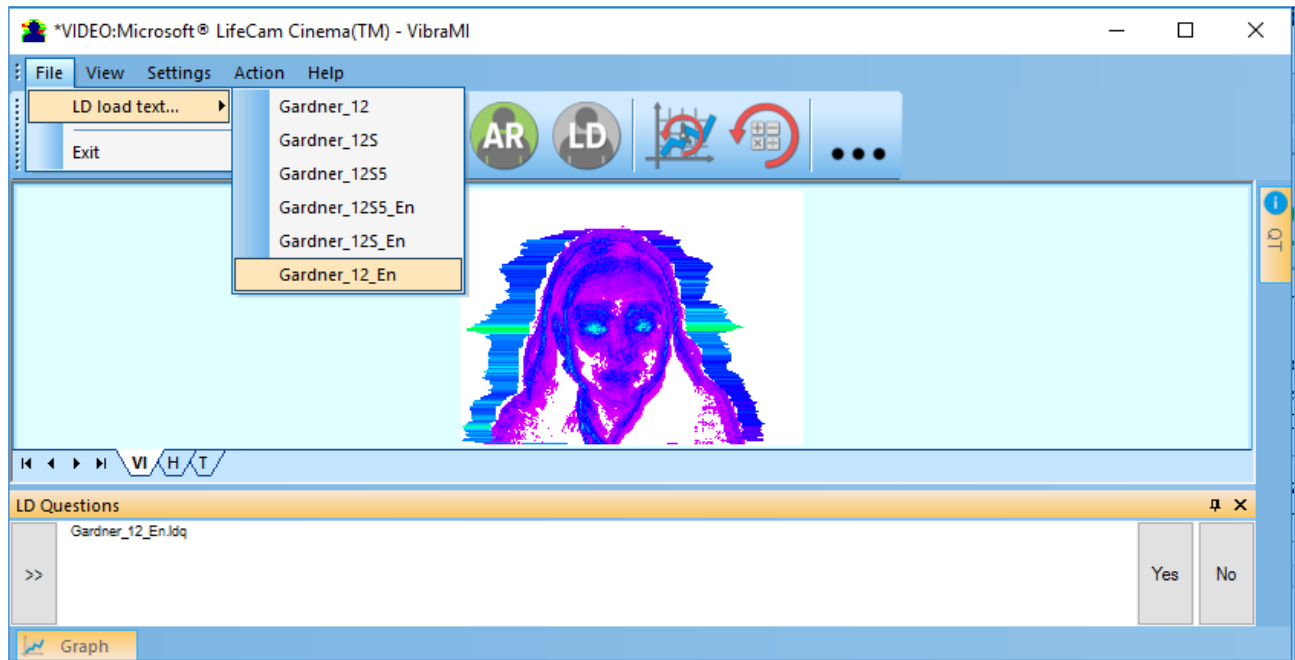


Fig. 3.13. Loading a new questionnaire.

The user may develop owns questionnaires on topics of interest to him and put them in the installation directory \PsyAccent\ in the same file format **ld_XXXXXX.ldq**.

3.4 Graphs

There are the following graphs (fig. 3.17) in **PsyAccent**:

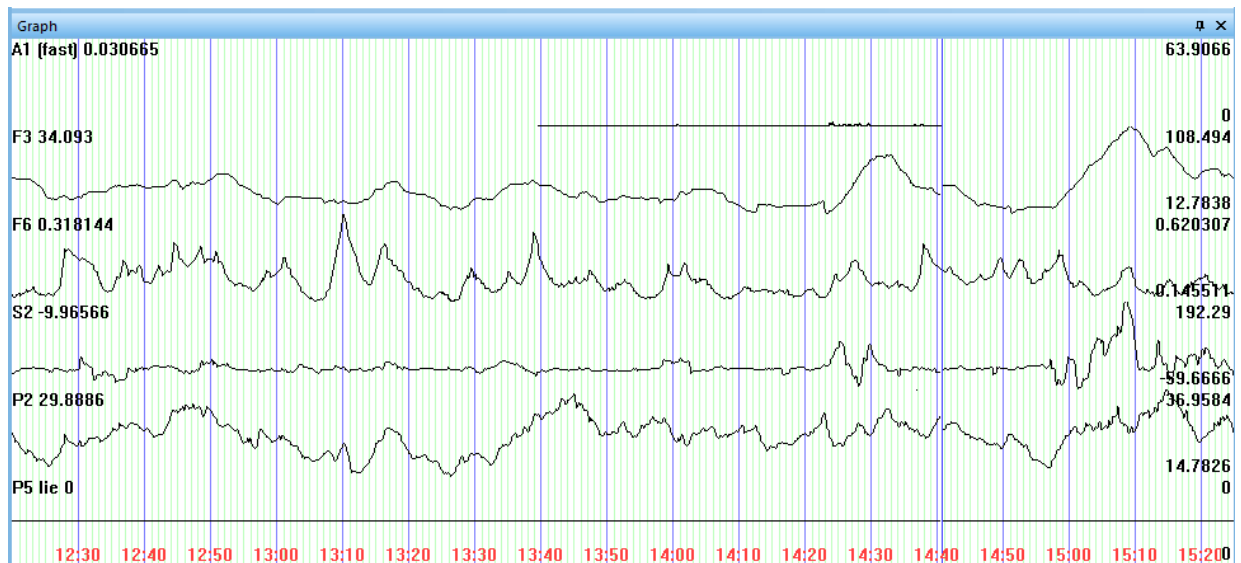


Fig. 3.19. **PsyAccent** graphs.

Attention, at work in a LD mode it is recommended to supervise under graphs of change in time following psycho physiological parameters describing all types of impellent activity: A1 fast, F3, F6, S2, P2, P5 lie.

A1 (fast) – shows maximum fast reaction of person for question or situation, so it changes before any other VI parameters, but goes down also immediately as it changed. This parameter shows macro movement and sometimes used for deleting artifacts from the hostile intentions detection process.

F3 – shows general mental energy level of examinee, in default settings this parameter calculates for time period of 20 seconds, so it is slowly changing parameter reflects psycho physiological state. High level of this parameter indicates high level of exciting, aggression or activity so it could be correlated with hostile intentions.

F6 – shows inhibition of person and also correlated with respiratory tracing or breathing activity, because it is physiology linked with inhibition process.

S2 – shows asymmetrical of movements in middle time (2 sec) period, so it includes left/right hemisphere activity components and it high changes usually indicates hostile intentions.

P2 – shows Mean-Square-Deviation (MSD) of frequency histogram and low meaning of this parameter usually indicates normal state, so high meaning of this parameter could be correlated with hostile intentions.

P5 lie – indicates hostile intentions level auto calculated for selected parameters. In Default settings for hostile intentions indication it is necessary to have significant changes at least in 8 vibraimage parameters, for example, **PsyAccent** system registers significant changes in 12 or more parameters, given in **PsyAccent** Report.

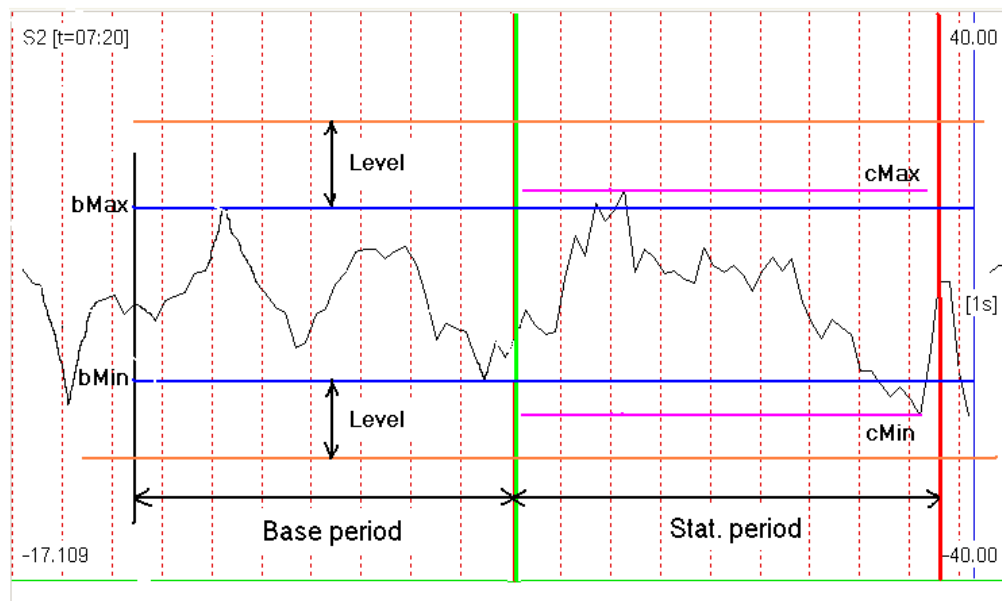
When working with graphics, special attention should be paid to signal changes in the graph of parameter P5 (hostile intentions), which define the most «suspicious» moments in human behavior. Each question and answer (preferably separated by a time interval of not less than 10 seconds) is characterized by a level change psychophysiological parameters tested person. This level is characterized by two integral indicators - the level P5 and parameter P20 in the window «LD» (see ch. 3.5), which provides a quantitative assessment of human responses to the question. The higher this parameter, the more likely there are hostile intention in the response.

For each parameter set following numerical values, which using in **PsyAccent** calculation:

Calculate	Yes - this parameter using in LD level calculation, No - not using.
R1V	«Weight» of parameter (Rate1) if its current value became more than the set base maximum bMax OR became less than the set base minimum bMin. Use in P5 parameter calculation.
R2V	«Weight» of parameter (Rate2) if its current value became more than the set base maximum bMax AND became less than the set base minimum bMin. Use in P5 parameter calculation.

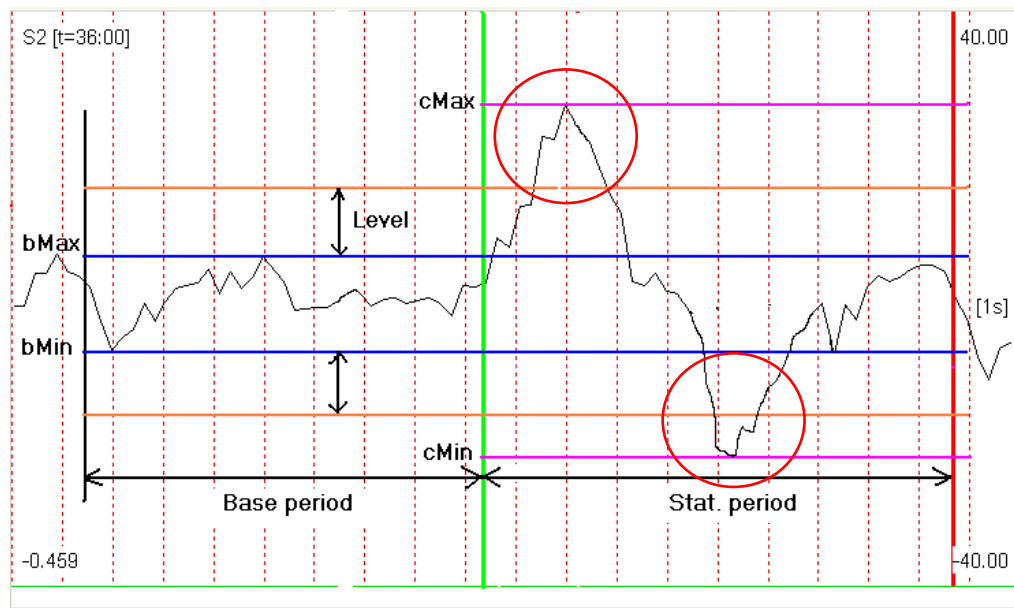
- R1C «Weight» of parameter (Rate1) if its current value became more than the set base maximum bMax **OR** became less than the set base minimum bMin. Use in P20 parameter calculation.
- R2C «Weight» of parameter (Rate2) if its current value became more than the set base maximum bMax **AND** became less than the set base minimum bMin. Use in P20 parameter calculation.
- Level In % determines on how many value of parameter should exceed the set limits that the system «considered» this change.

The following are examples which illustrate the principle of collecting information. Fig 3.18 has no difference in the «threshold» values of S2 in intervals «Stat period» and «Base period». Fig 3.19 during the interval of definition hostile intentions (Stat period) value S2 has exceeded the maximum threshold.



for parameter S2 Rate=0

Fig. 3.18. S2 parameter value is within the limit.



for parameter S2 Rate2=2

Fig. 3.19. One of the parameters was significantly higher than both the established limit.

4 PsyAccent operation principles

PsyAccent is program for psychophysiological testing (PPT) of a person by the vibraimage technology and special questionnaire for personality accentuation detection.

The basis of **PsyAccent** analysis is a comparison of the conscious response to questions and stimuli (the Yes / No answers of tested person) with the unconscious psychophysiological response determined by vibraimage technology. Presented questions and stimuli are consistently grouped according to the types of accentuation

4.1 Conscious response to the questions (Yes/No)

Let's consider conscious response YN of the test person at an answer to a pair of consecutive questions relating to a one type of accentuation for PA questionnaire. Questions in this questionnaire presented so that the person with the developed type of this accentuation answered to a first question «Yes», and to the second question - «No». For example, the questions of the PA questionnaire relating to the introverted (IV) type of accentuation:

1 Do people usually tire you too much?

2 Do you have a wide circle of friends?

In this example, person answers on the first question “Yes”, on the second question – “No” (Yes/No). Then parameter YN for 1 IV on profile of accentuation is 100 % (fig. 4.1, column 1). If answers are Yes/Yes or No/No then 50 % (fig. 4.1, column 2, 3, 4, 7, 9, 10, 12). If person answers for first question “No”, on the second question – “Yes” (No/Yes) then meanings of parameter is 0 % (fig. 4.1, column 5, 6, 8, 11).

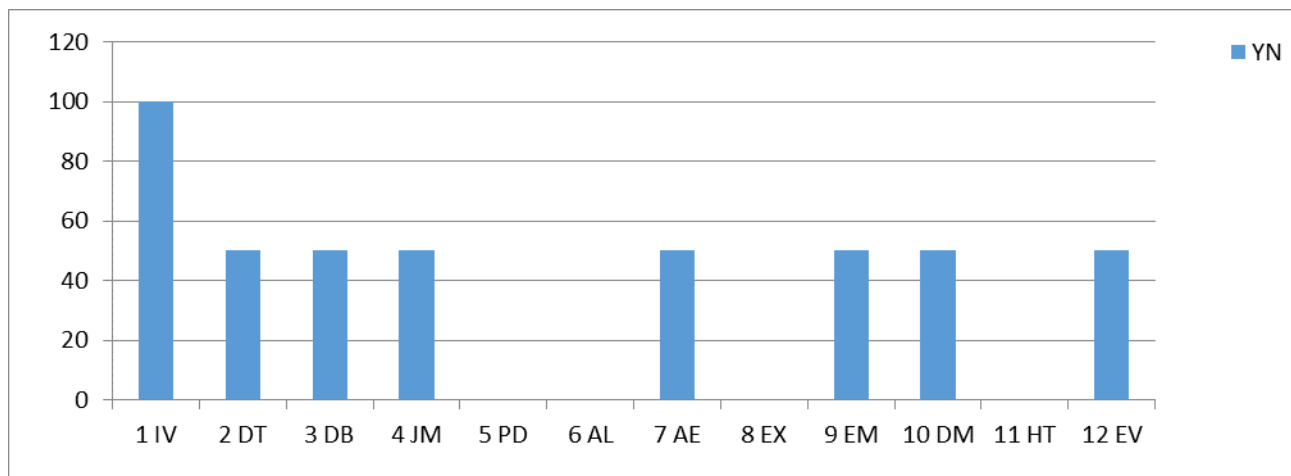


Fig. 4.1. The resulting graph of conscious reaction Yes / No for types of accentuation

4.2 Psychophysiological (unconscious) response (I-E)

The unconscious response is measured by analyzing the information state and energy state (IE) as general features of psychophysiological state by vibraimage technology. This technology is similar to psychophysiological detection of deception and confirms or rejects conscious response based on positive or negative reaction of the examined person on the indicated stimulus.

As an example, we will consider the change of a psychophysiological status (PPS) of the person given in a scale information - energy in fig. 4.2 Actual PPS is displayed in the form of a point and change of person's PPS in time is displayed in the form of a straight line or a curve between two points. The example of PPS change from a state 0 in various states 1, 2, 3, 4, 5 is given in figure 4.2.

As shown in fig. 4.2 on the information-energy diagram changing from initial PPS (point 0) to other states is characterized by one change of consumed energy and different states of psychological comfort.

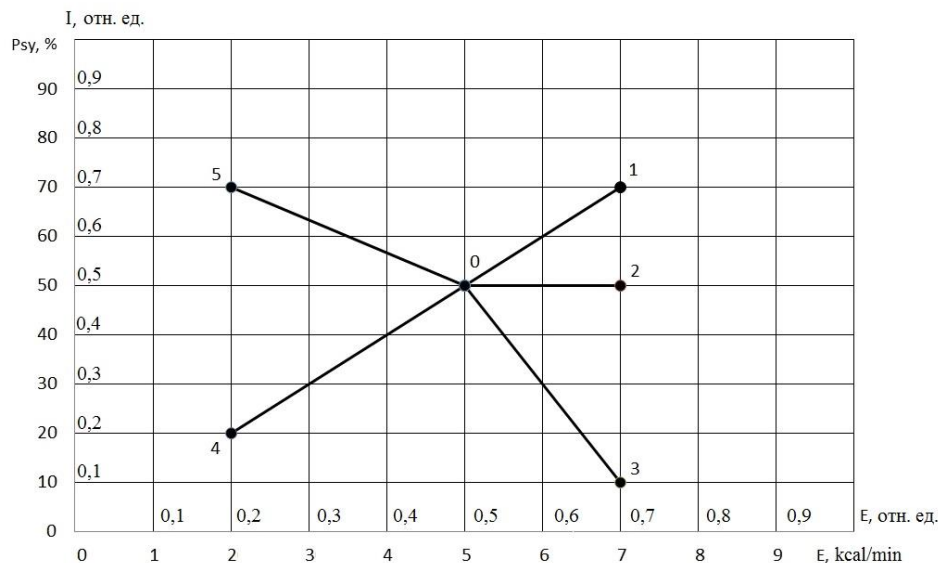


Fig. 4.2. Information-energy diagram of the PPS.

Transition 0-1 is characterized by an increase in energy consumption and improvement of psychological state. The reason of this PPS change can be a good or pleasant news (the stimulus), it leads to a more intensive exchange processes (increase in energy consumption), and the psychological condition and mood notably improved (entropy of metabolic processes decreased, and the information content of the exchange increased).

Transition 0-2 is characterized by an increase in energy consumption and an even level of psychological state. The reason can be, for example, an increase in mental and physical activity, which lead to more intensive exchange processes (increase in energy consumption), at the same time, the psychological state and mood are unchanged, as conducted by the impact did not cause emotional changes.

Transition 0-3 is characterized by an increase in energy consumption and impairment of psychological state. The reason can be unpleasant information that leads to a more intensive exchange processes (increase in energy consumption), and the psychological condition and mood became notably worse (entropy of metabolic processes became worse, and the information content of the exchange decreased).

Transition 0-4 is characterized by a decrease in energy consumption and impairment of psychological state. The reason can be unpleasant information that leads to a slowing of metabolic processes (reducing energy consumption), and the psychological condition and mood became notably worse (entropy of metabolic processes became worse, and the information content of the exchange decreased).

Transition 0-5 is characterized by a decrease in energy consumption and improvement of psychological state. The reason can be pleasant news, which soothes and slows down the metabolic processes (reducing energy consumption), and the psychological condition and mood are notably improved (entropy of metabolic processes decreased, and the information content of the exchange increased).

These explanations describe the physiological processes on a qualitative level, and **PsyAccent** program produces a quantitative calculation of information-energy processes occurring in the person upon presentation of stimulus. **PsyAccent** shows the calculated human physiological reactions after each question in the form of an information chart (Fig.4.3).

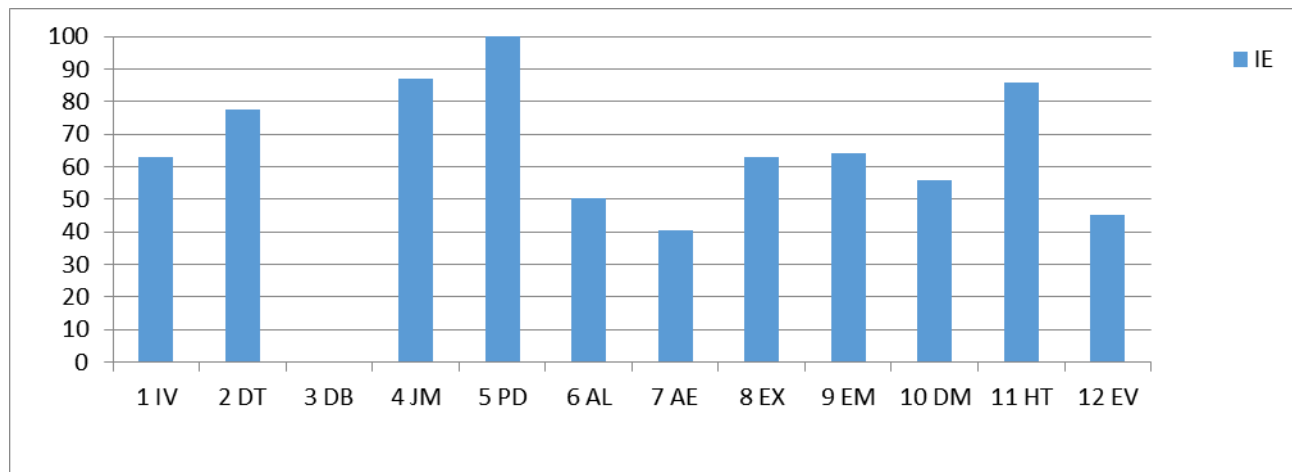


Fig. 4.3 Measurement of the psychophysiological responses to stimulus

The resulting unconscious **PsyAccent** profile illustrates attitudes of the examinees concerning their abilities, i.e. minimally reflects the social stereotypes of desirable behavior.

5 Saving and analyzing results

Test results can be viewed using standard Windows functions, such as pressing the PrintScreen and download images from the screen to any standard program such as Paint to view graphics.

After completing of the questionnaire program **PsyAccent** automatically creates files with the test results in the directory «C:\Users\user\Documents\PA Result».

The result of testing recorded in the form of files of the following types:

YYYY-MM-DD hh_mm_ss_PA.xlsxm	main results of intelligence profile, aptitude and skills abilities. Excel format
YYYY-MM-DD hh_mm_ss_M.xlsx	testing result for Mental-Functional state. Excel format
YYYY-MM-DD hh_mm_ss_e.txt	text file with a list of questions with the ranking of reaction to them, calculated by different algorithms (A, M, I, S, S1, At, It, IE);
YYYY-MM-DD hh_mm_ss_histH.png	graphic file with the histogram of frequency distribution
YYYY-MM-DD hh_mm_ss_histH.xml	data file with the histogram of frequency distribution. XML format
YYYY-MM-DD hh_mm_ss_histT.png	graphic file with graphs of I-E state of a person changes over the period
YYYY-MM-DD hh_mm_ss_LD.txt	measurement results based on LD calculations. Text format
YYYY-MM-DD hh_mm_ss_M.xml	Testing result for Mental-Functional state. XML format
YYYY-MM-DD hh_mm_ss_PA.xml	main results of PPS changes during the PFT is presented synchronously with graphical and text information. XML format
YYYY-MM-DD hh_mm_ss_PA2.xml	alternative results of PPS changes during the PFT is presented synchronously with graphical and text information. XML format
YYYY-MM-DD hh_mm_ss_row.txt	text file with the results of the measurement parameters on questions for statistical processing. Text format

In all files in names **YYYY-MM-DD** and **HH_MM_SS** date and time of measurement.

5.1 Final test results

The main results of the change in PPS when carrying out the PPT simultaneously with the presented graphic and text information are saved in the Excel file (Fig. 5.1 - 5.9) and in text files.

Note, in the text file **vi YYYY-MM-DD HH_MM_SS_row.txt**, if the camera settings and shooting conditions were incorrect, then at the end of the question and at the end of the file a message about the specific causes of the errors with a quantitative contribution to the overall quality will be appeared.

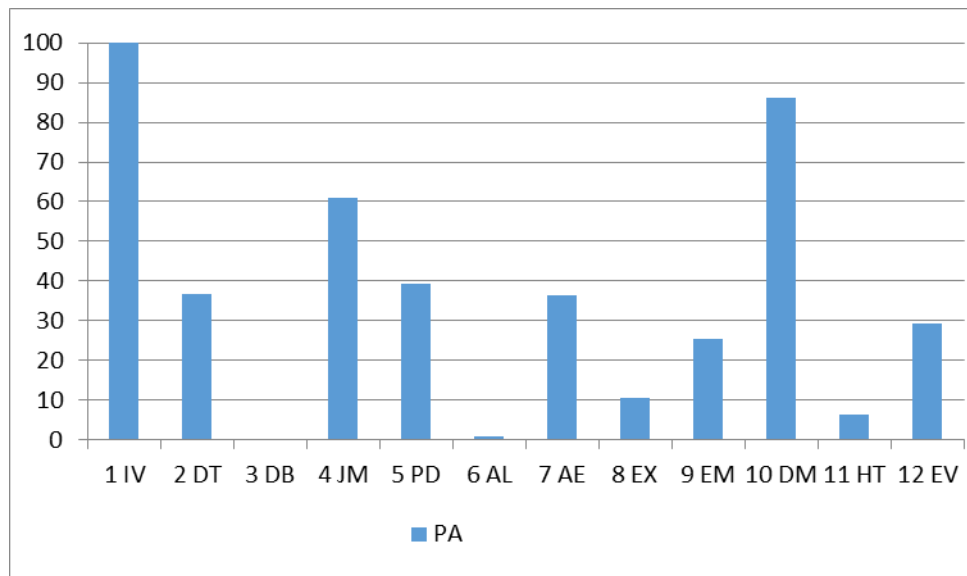


Fig. 5.1. Accentuation profile

N	%		Accentuation types
1	100	IV	Introverted (IV)
2	86	DM	Demonstrative (DM)
3	61	JM	Jamming (JM)
4	39	PD	Pedantic (PD)
5	37	DT	Dysthymic (DT)
6	36	AE	Affective-exalted (AE)
7	29	EV	Extraverted (EV)
8	25	EM	Emotive (EM)
9	11	EX	Excitable (EX)
10	6	HT	Hyperthymic (HT)
11	1	AL	Affective-labile (AL)
12	0	DB	Disturbing (DB)

Fig. 5.2. Accentuation profile with ranking

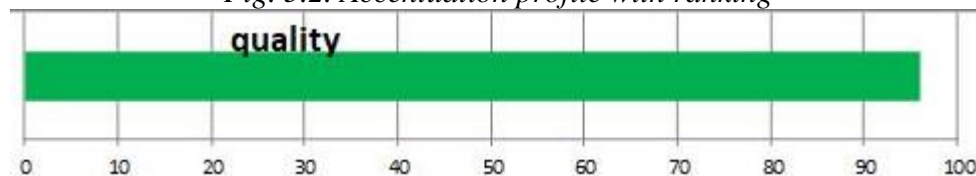


Fig. 5.3. Psychophysiological test quality

N	%		The main features of accentuations
1	100	IV	self-reliance, moderately communicative skills
2	86	DM	artistic, hysterical, arrogance, selfishness
3	61	JM	touchiness, suspiciousness, rancour, ambitiousness, self-love
4	39	PD	ultra irresolution, anxious suspiciousness, anxious suspiciousness, propensity to introspection, pedanticism, various fears
5	37	DT	morose, aggravated sense of duty, stability of interests and affections
6	36	AE	strong mood swings: from unlimited happiness to unbearable anxiety
7	29	EV	good communication skills
8	25	EM	impressionability, vulnerability, kindness, dreaminess
9	11	EX	irritability, vehemence, anger
10	6	HT	always in a good mood, high spirits
11	1	AL	cyclical mood: change of dysthymic and hyperthymic phases
12	0	DB	disquietude, anxiety, timidity, shyness, various fears

Fig. 5.4. The main features of accentuations

N	%		Vulnerable place
1	100	IV	the need to quickly enter into informal contacts
2	86	DM	acceptance of responsibility, propensity to displace (forget about everything is bad or do not like to doing)
3	61	JM	persistence of negative emotional experiences (affects); can not forgive
4	39	PD	the situation of uncertainty, the situation of waiting, the need for decide by himself
5	37	DT	the need to take part in entertainments, pessimistic attitude to the future
6	36	AE	sensitivity, high emotional vulnerability, inclination to exaltation (hyperbole)
7	29	EV	loneliness
8	25	EM	criticism, intolerance of all forms of violence

9	11	EX	impulsiveness, intolerance for someone else's opinion (criticism)
10	6	HT	hard discipline, niggling control, situations of forced idleness, monotonous work, isolation from people (collective)
11	1	AL	slow reaction and cogitative processes, painful perception of outside criticism in the dysthymic phase
12	0	DB	the need to speak public performance; suspicions and sneers on the part of people

Fig. 5.5. Vulnerabilities of the tested person

N	%		Compatibility
1	100	IV	introverted, dysthymic, disturbing, jamming, pedantic
2	86	DM	extroverted, hyperthymic, affective-exalted, dysthymic, disturbing
3	61	JM	introverted, pedantic
4	39	PD	introverted, pedantic, dysthymic, disturbing, emotive
5	37	DT	introverted, disturbing, pedantic, emotive
6	36	AE	extroverted, emotive, hyperthymic
7	29	EV	extroverted, hyperthymic, hysteroid, emotive, excitable
8	25	EM	extroverted, affective-exalted, emotive, hyperthymic, affective-labile
9	11	EX	extroverted, disturbing, hyperthymic
10	6	HT	extroverted, hyperthymic, emotive, affective-labile, affective-exalted
11	1	AL	extroverted, emotive, hyperthymic
12	0	DB	introverted, pedantic, emotive, hyperthymic

Fig. 5.6. Recommended features for compatibility

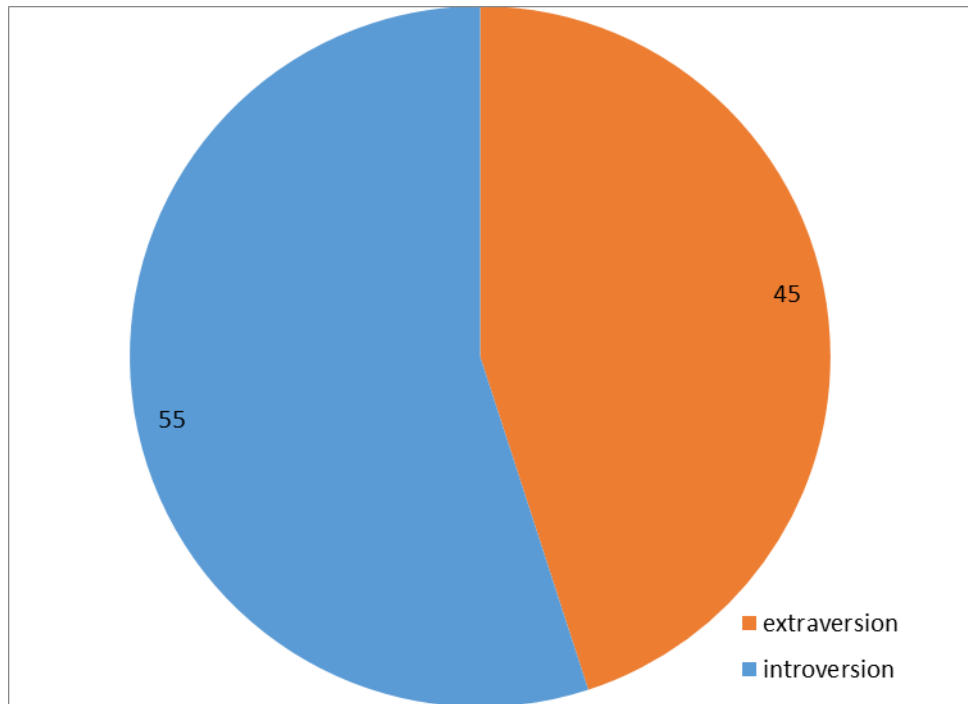


Fig. 5.7. The ratio between extroversion and introversion in a person

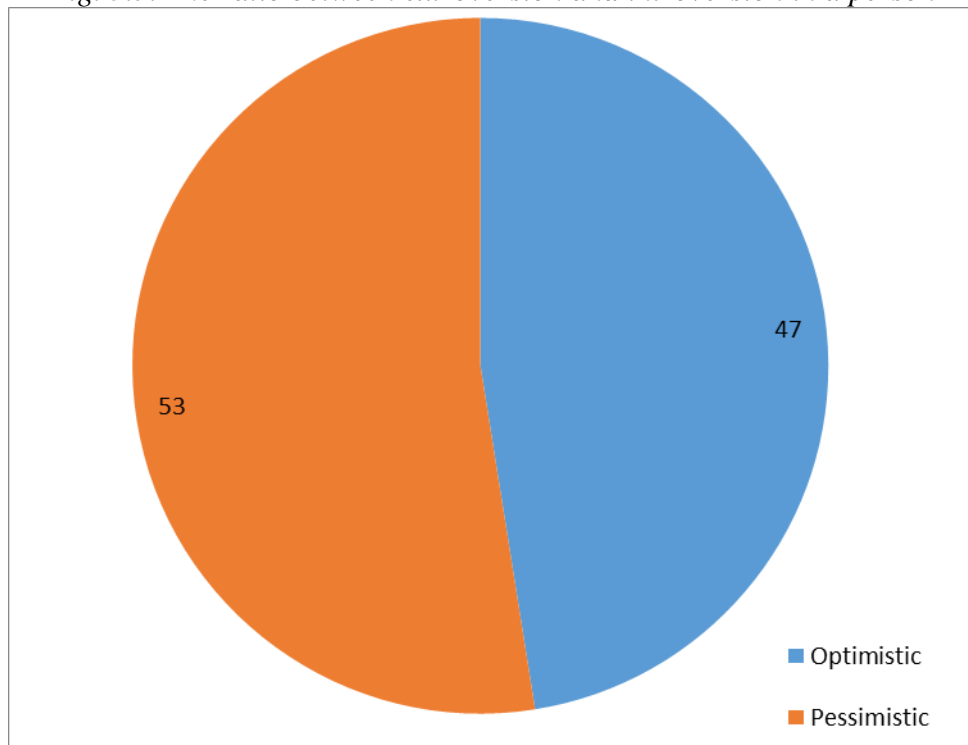


Fig. 5.8. Ratio between optimistic and pessimistic relation during current PPT

In the fig. 5.9 there is ratio between conscious and conscious response during current PPT. In the left bottom part of the chart there is graph of sum Pearson's correlation coefficient. It's counted on graphs I(t) and E(t) from the file **YYY-MM-DD hh_mm_ss_M.xlsx**.

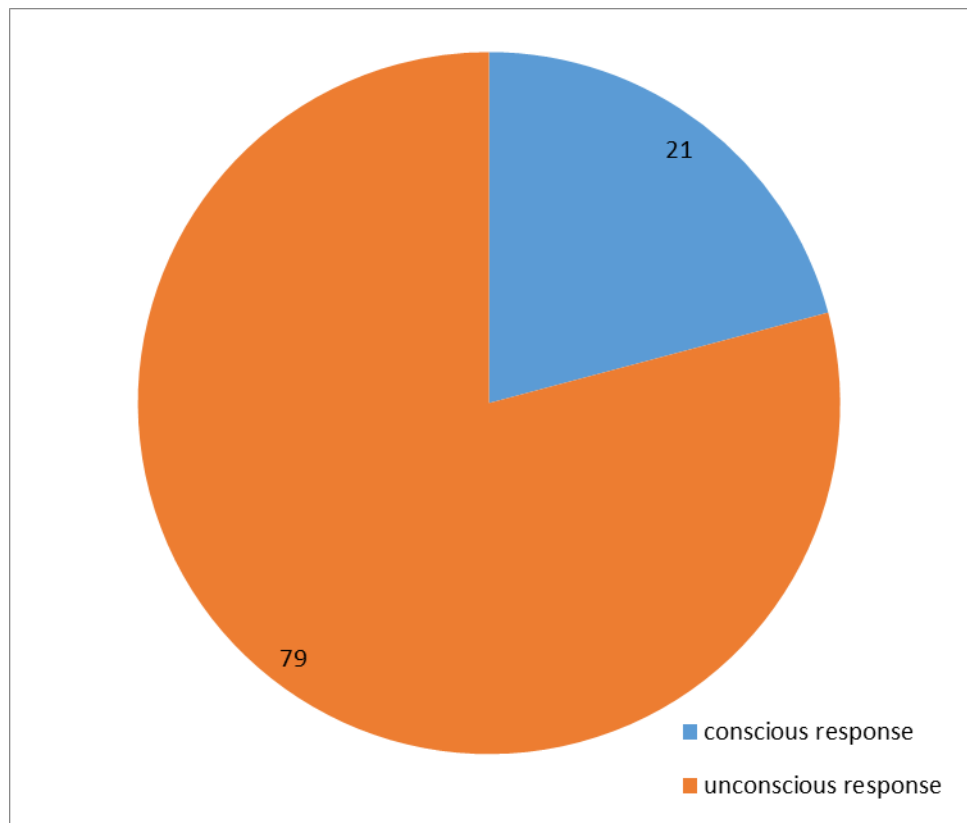


Fig. 5.9. Ratio between conscious and unconscious response during current PPT.

5.2 Statistic data of PsyAccent

There are graphs Final, Final', YN, IE and YN - IE in xlsx file in MIStat sheet before the Final tab (Fig. 5.1, 5.10 – 5.13).

The Final graph is the same as the PsyAccent (PA) profile graph (Fig. 5.1). It summarizes the conscious response to questions (YN) and the subconscious (IE), but is calculated with averaging over the first 4 and last 4 PA types subconscious response (IV, DT, DB, JM and EM, DM, HT, EV).

Final' is similar to the Final graph but it is without averaging of opposite MI types (Fig. 5.10).

The graph of YN (Yes / No) shows conscious response based on the answers to the questions (Figure 5.11). For more details, see section 4.1.

The graph IE shows the change in the information-energy state of a person during PPT). For more details, see section 4.2.

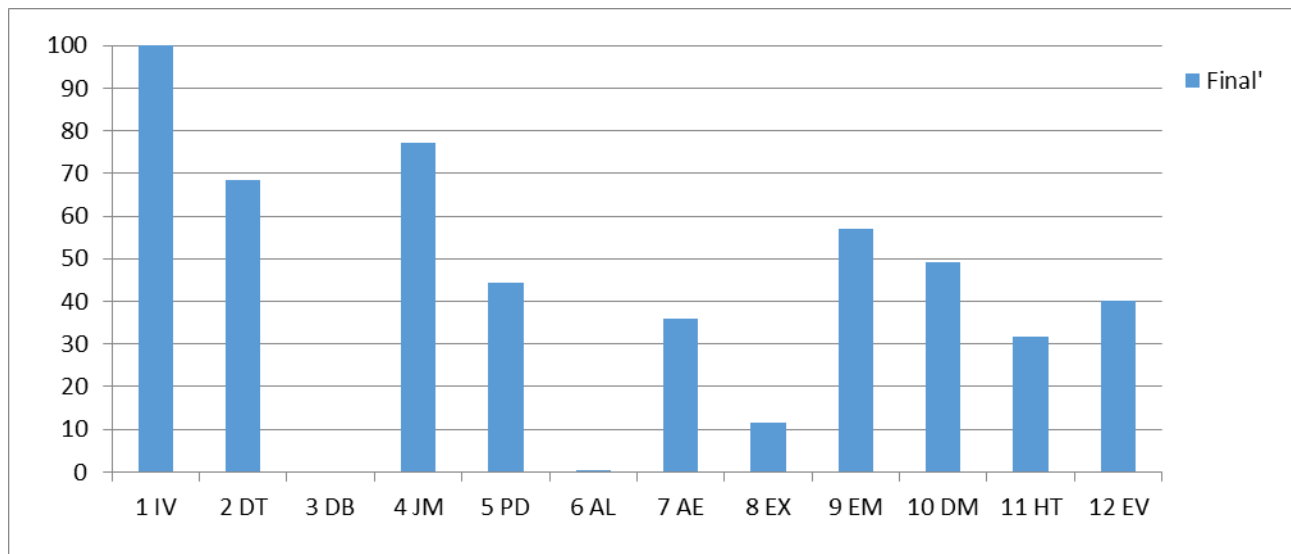


Fig. 5.10 PA profile without correction IE unconscious response.

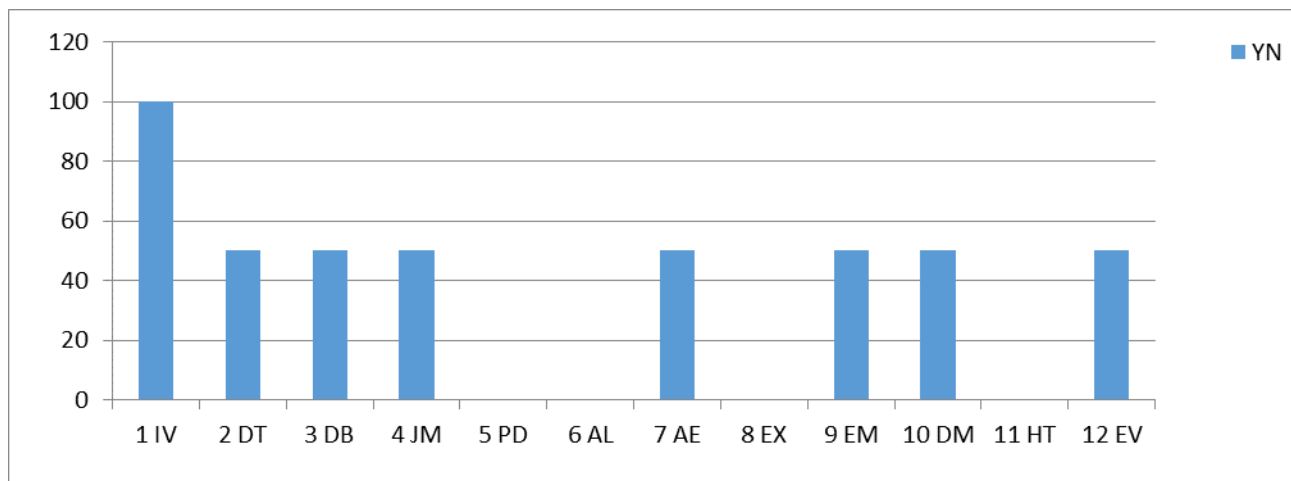


Fig. 5.11 PA profile on conscious response only (Yes/No).

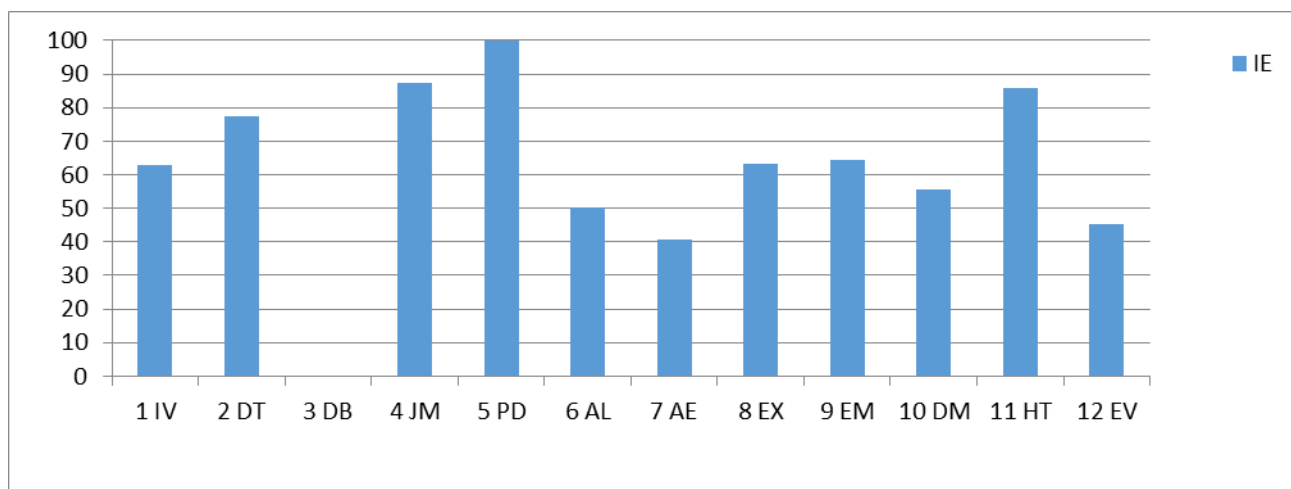


Fig. 5.12 PA profile on subconscious response only (IE).

Graphs in Figures 5.10 - 5.13 are results of one person testing. Graph on conscious response (Fig. 5.11) shows that tested person thinks that his strengths Introverted (IV) PA type and weakness is Pedantic (PD), Affective-labile (AL) types. Graph on subconscious response (Fig. 5.12) shows that tested person reacted most strongly to questions for Pedantic (PD), Jamming (JM), Hyperthymic (HT) PA types.

Figure 5.13 clearly shows *difference* (the differential PA profile) between conscious and subconscious responses, obtained when constructing PA profiles. Max difference is for 5 PD PA type. Four of the twelve PA types more than 0 (above the axis). It means that conscious perceptions of tested person's own abilities have a greater weight (value) than unconscious perceptions. By the "comfort zone" we mean the minimum dispersion of values of the analyzed index lower than ± 10 %. 7 AE, 9 EM, 10 DM, 12 EV these are types for the graph fig. 5.13.

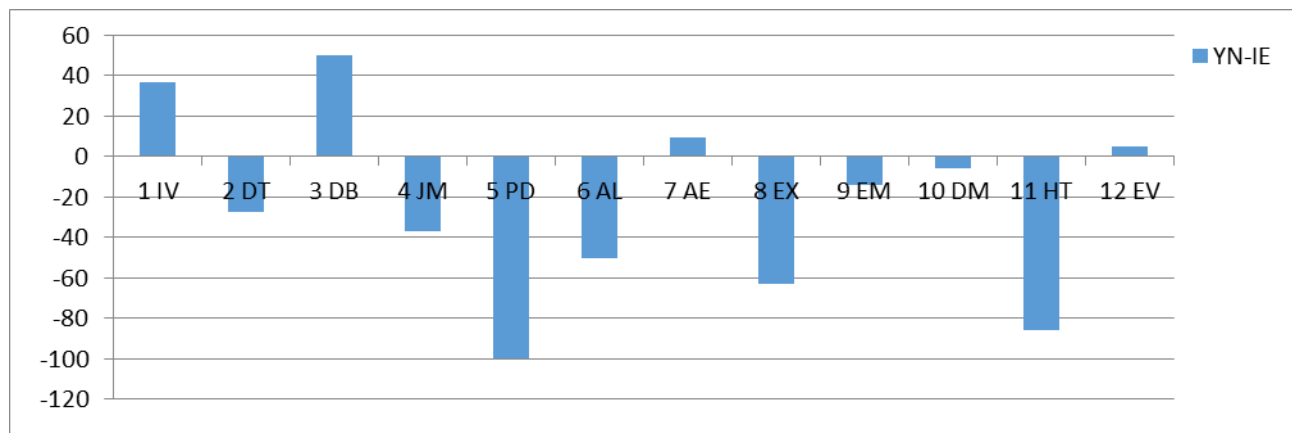


Fig. 5.13 Differential PA profile.

An ideal differential PA profile for the perfect person, from the viewpoint of equality of conscious and unconscious person's responses, should represent small columns of the PA types, which are not going beyond ± 10 % or having approximately equal the weight of positive and negative responses in YN-IE graph. In a harmoniously developed person, the area of the integral, which is higher and lower of the axis on the differential profile, should be approximately equal. In this case, a conscious response is prevailing for some PA types, and for other PA types – an unconscious response. At the same time, generally an approximate equality is observed. Figure 5.13 represents results indicating that the values of differential PA profile is far from perfect and harmonious.

Graph "IE correl" (Fig. 5.14) is very useful for better understanding reactions on different questions. On this graph you can see value of Pearson's correlation coefficient for each question. If a person feels himself well and he does not strain during answer a question, or if he feels bad and strains to respond, then the Pearson's correlation coefficient is higher than 0. If the change I and E varies differently in the process of the response, then the coefficient is negative.

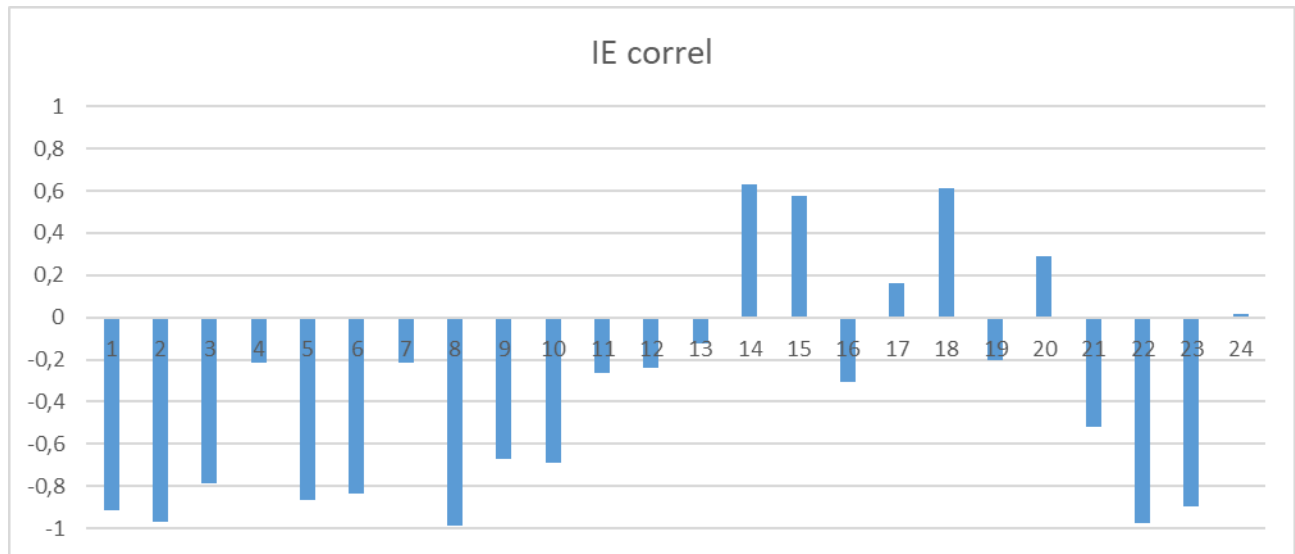


Fig. 5.14 Pearson's correlation coefficient for each question

Graph IE correl indicates time dependences of Information and Energy parameters analysis on graphs $I(t)$ and $E(t)$ (Fig. 5.15) from the file **YYY-MM-DD hh_mm_ss_M.xlsx**. These time dependences give additional information about person replies to corresponding questions.

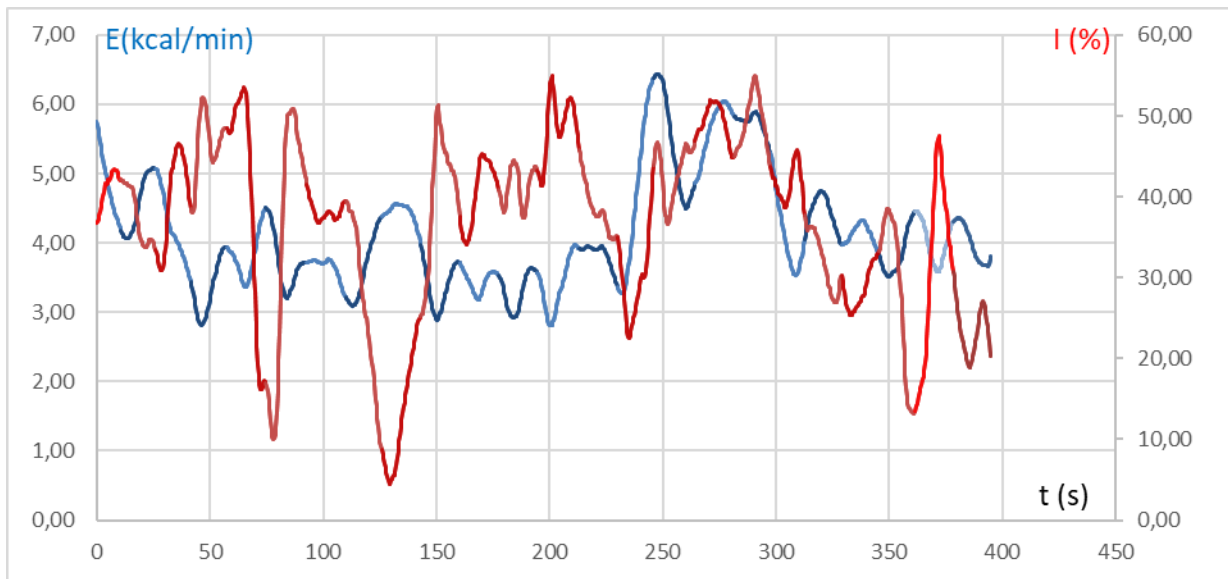


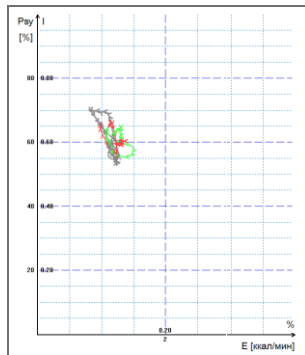
Fig. 5.15 Time dependence of parameters I and E for each question

5.3 Graphs of PPT changes

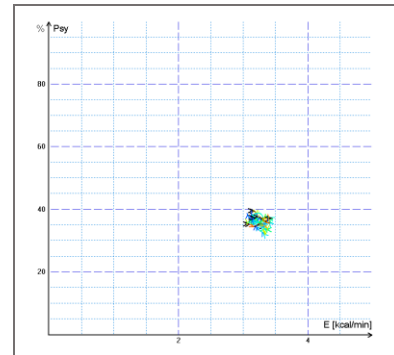
Changing of I-E state of a person to a controlled period of time clearly displayed on the graph (see fig. 5.16). Only a person who is in a relaxed or in a state of high concentration (see fig. 5.16b) may be in a fixed I-E state during such insignificant time as 1 minute. Most of the people make a noticeable fluctuations of I-E state, even for short periods of time, depending on their thoughts (see fig. 5.16a) and under the influence of the environment (see fig. 5.16c).

Color line of I-E state changes corresponds to the «color» of the test question:

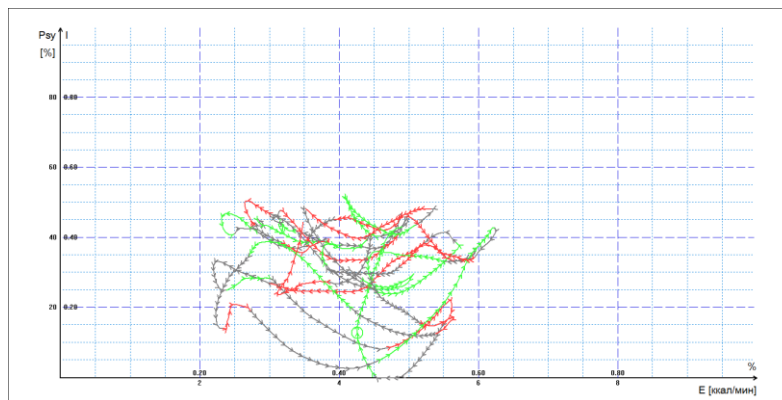
- time between questions – grey;
- control questions – green;
- relevant questions – red.



a) Changing around the average value



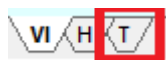
b) Stable condition, indicating a high degree of self-control person..



c) Periodic change I-E state along a certain trajectory, usually characteristic for an interview, type a question-answer

Fig. 5.16 (a, b, c). Change person psycho-energy conditions for the chosen period.


User can see I-E state graph on tabs



on the main window.

5.4 Frequency histogram of PPT

Frequency (green) and amplitude (red) histograms (Fig. 5.17) of PPT shows the total distribution of the tested person vibrations for all the test time. The similarity of the received histogram to the normal law of distribution means a normal state of the tested person during the test. Asymmetry or multimodality of the received histogram argue of certain deviations from the norm during the test.

User can see histograms on tab  on the main window. Each histogram is characterized by the following parameters:

- M – the center of weights of frequency distribution (average value of microvibrations frequency);
- S – root-mean-square deviation of frequency distribution;
- D – a dispersion of frequency distribution.

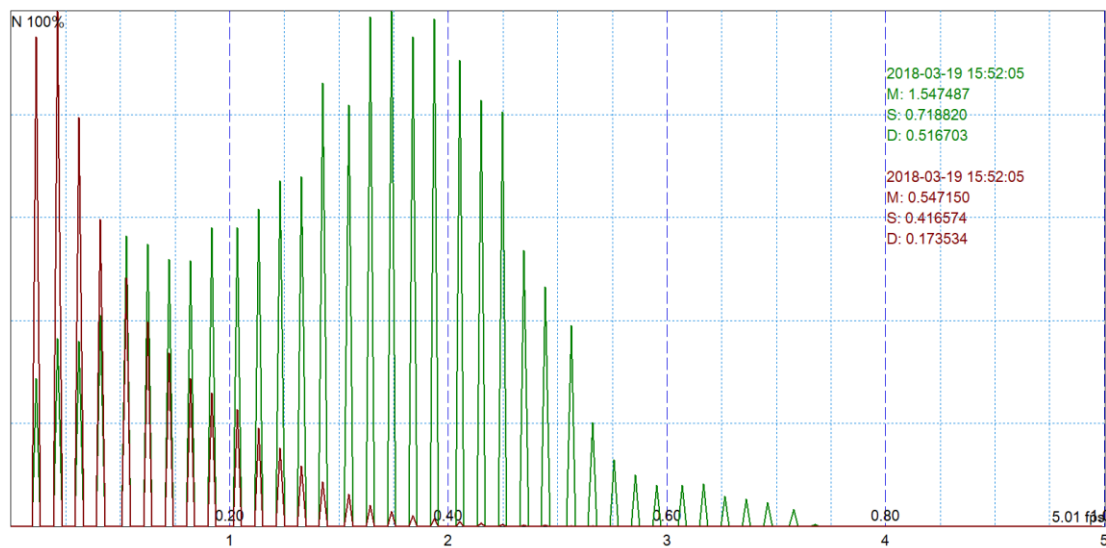


Fig. 5.17 Frequency (green) and amplitude (red) histograms of PPT.

5.5 Psychophysiological status of the person

Psychophysiological status of the person is indicated in standard M.xlsm file.

1. Every from T1-T10 psychophysiological parameters measured by vibraimage system are specified to range 0 - 1 (0 - 100) % using fixed coefficients experimentally selected.
2. Mathematical formula by which measured psychophysiological parameter is determined is primary, and a code name (for example, Aggression) is secondary.

Psychophysiological meaning of each parameter T1-T10 may be varied depending on the experimental conditions.

3. The set of measured parameters T1-T10 determines the total psychophysiological (psychosomatic, functional) status of a person based on the integral coefficient K.

Statistical processing of parameters measured in a mode «M» is carried out by the program Vibrastat.

On Psy variability-Mental basal metabolism diagram (see more information in ch. 4.2) changing of person's PPT state is highlighted with different colors. For example, last question link with red color.

For more information about this file (Fig. 5.5) refer to «Behavior Detection System. VibraImage 10 PRO. Manual», http://www.psymaker.com/downloads/VI10_ManualEng.pdf in the section «M Mode».

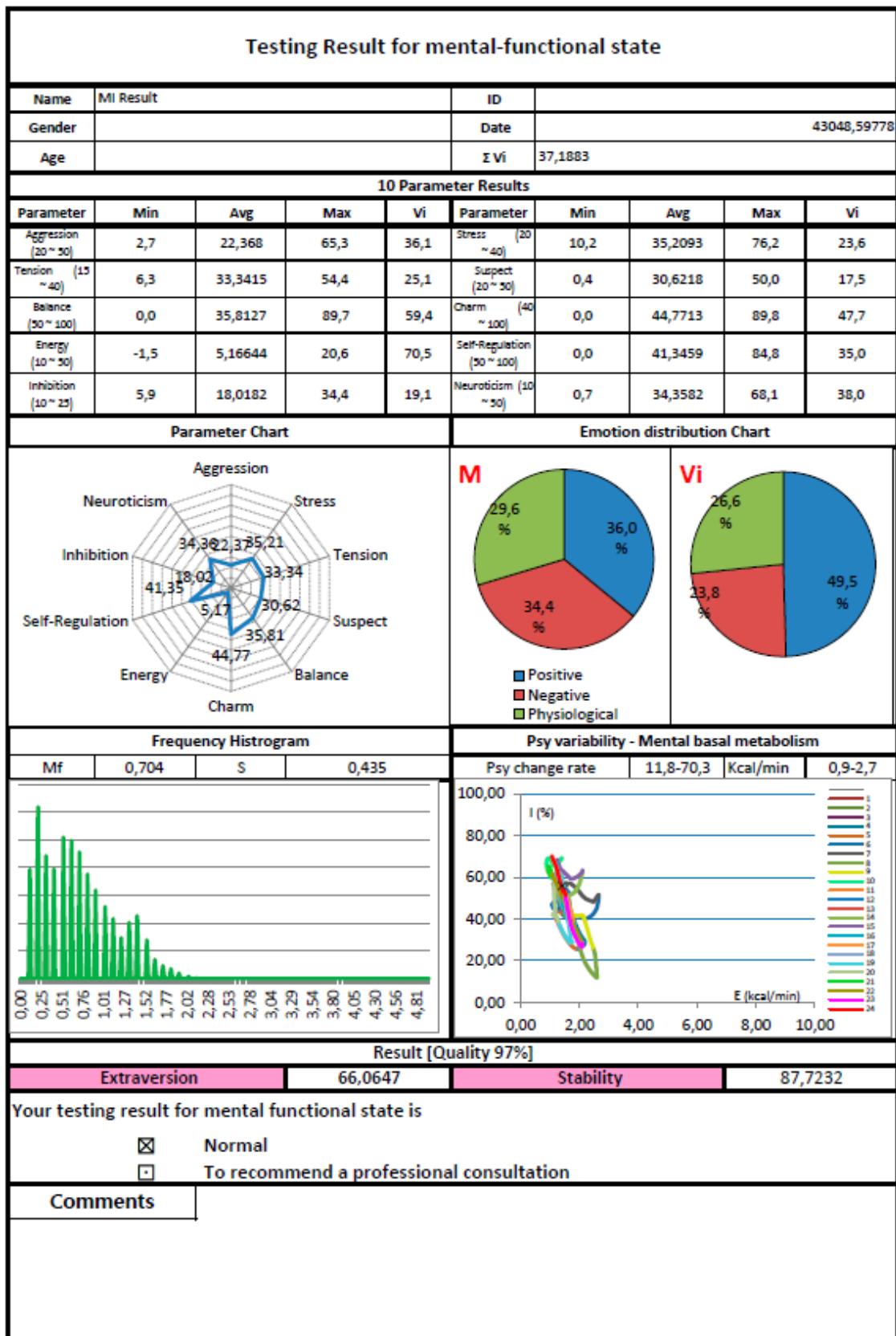


Fig. 5.18 Psycho-emotional status of the person

5.6 Recording of test results. Excel file start

Full record of values parameters registered by vibraimage system is recorded to a text file with the ending row. This file can be used for statistical research and testing of algorithms for determining PPS and PFT.

This file can be copied and transferred to Excel for self-treatment.

Note, if Macros have been disabled in current Excel program you need to start Macros in manual mode. In this case after test finishing you will see empty table as it is shown on fig. 5.19.

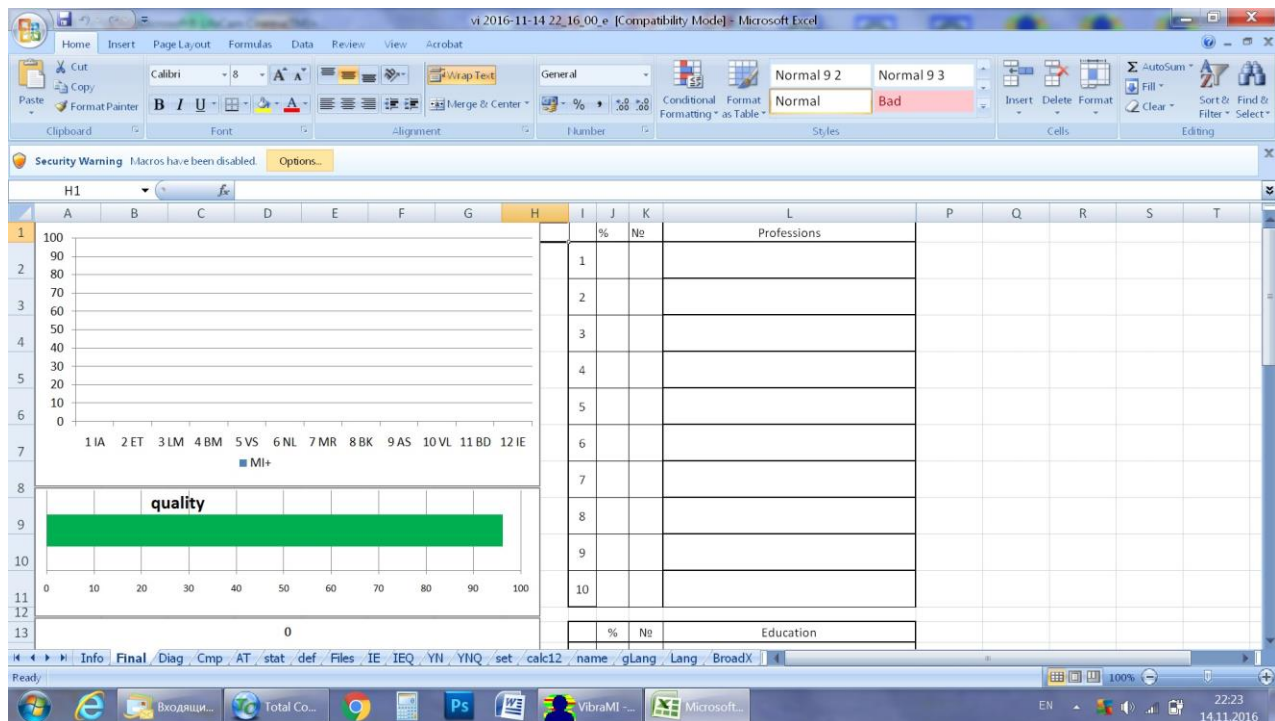


Fig. 5.19 Empty table of excel file with disabled macros

In this case you need to enable Macros function in the manual mode as it is shown on the fig. 5.20.

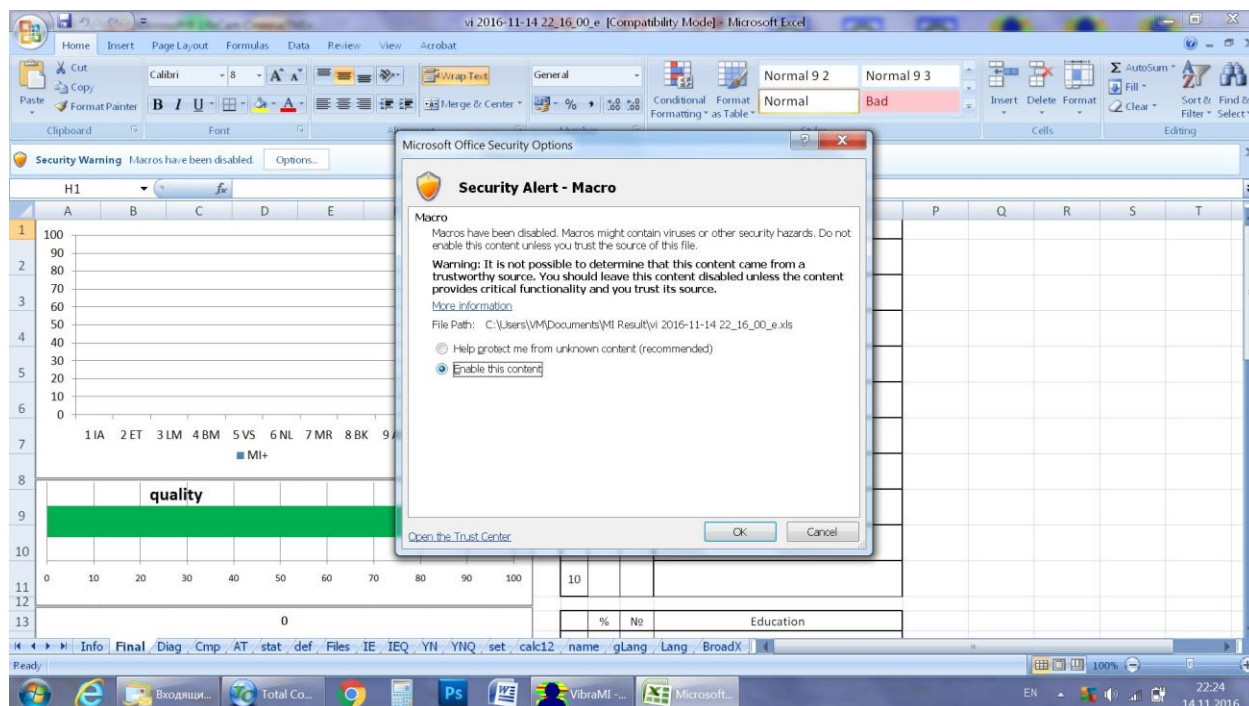


Fig. 5.20 Macros enable function start

Concrete interface of Macros function enabled depends on the version of stand Excel program and can differs from fig. 5.19 and 5.20. So you need to use Excel help for starting Macros function in the opened file for calculation of MI parameters.

6 Warranty

Maintenance service and service regulations of **PsyAccent** system is carried out according to this Manual and instructions of used hardware maintenance (a computer, the camera, etc.).

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Version **PsyAccent** 10

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