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CAT-MH™ API

Overview

The Computerized Adaptive Testing-Mental Health (CAT-MH™) suite of web applications provides the tools needed to create, administer and review the results of mental health tests for a specific individual (i.e., a subject). An interview is comprised of one or more tests for the assessment of major depressive disorder, depression, anxiety, mania/hypomania or suicidality in one particular subject. While an interview was designed to be administered in one sitting, it can be interrupted and later resumed, if necessary. More than one interview can be created for a particular subject, allowing for the longitudinal testing and monitoring of that subject's mental health over a period of time.

The CAT-MH™ Application Program Interface (API) is a set of web services that facilitate the communication between the CAT-MH™ web applications and any client application capable of sending requests via the HTTP protocol and processing JSON data. These web services provide ways to create one or more interviews for a specified subject and to administer a particular interview.

Interviews

Creating an Interview

An interview is comprised of one or more tests for the assessment of Major Depressive Disorder (mdd), Depression (dep), Anxiety (anx), Mania/Hypomania (m/hm), C-SSRS Suicide Screen (c-ssrs) or Suicide Scale (ss) in one particular subject. You can create one or more interviews for a particular subject by sending a single request to the **createInterview** web service.

To create an interview, send a **POST** HTTP request to:

<https://www.cat-mh.com/portal/secure/interview/createInterview>

Request Headers

| Header | Value | Description |
|---------------|------------------|--|
| applicationid | <To be provided> | The encoded ID of the application (client) |

Request Body

The request body should be a JSON object with the following properties:

| Property | Type | Value | Description |
|----------------|--------|------------------|--|
| organizationID | number | <To be provided> | The registered organization ID |
| userFirstName | string | "Automated" | The first name of the registered user authorized to create interviews via the CAT-MH™ API. |

| Property | Type | Value | Description |
|--------------------|--------|------------|--|
| userLastName | string | "Creation" | The last name of the registered user authorized to create interviews via the CAT-MH™ API. |
| subjectID | string | | The unique ID for a subject (up to 32 characters). A new subject will be created if the subject ID provided in the request is not already in the CAT-MH™ system. |
| numberOfInterviews | number | | The number of interviews to be created at this time. Multiple interviews can be created for the same subject in advance. |
| language | number | | 1 for English, 2 for Spanish |
| tests | array | | Current available test types are: 'mdd', 'dep', 'anx', 'm/hm', 'c-ssrs' and 'ss'. |

Example:

```
{
  "organizationID": 1,
  "userFirstName": "Automated",
  "userLastName": "Creation",
  "subjectID": "0001",
  "numberOfInterviews": 1,
  "language": 1,
  "tests":
    [
      {
        "type": "mdd"
      },
      {
        "type": "dep"
      }
    ]
}
```

Response

If the request is successful, the response body is an array of JSON objects, each object representing an interview and the credentials needed to be able to administer that interview.

| Property | Type | Description |
|-------------|--------|---|
| interviewID | number | The number that uniquely identifies the interview in the CAT-MH™ system. |
| identifier | string | A randomized unique string that can be sent in a POST HTTP request to the interview/signin web service in order to administer the interview. Once an interview is completed, its identifier is deleted from the system. |
| signature | string | A randomized unique string that can be sent in a POST HTTP request to the interview/signin web service in order to administer the interview. Once an interview is completed, its signature is deleted from the system. |

Example:

```
{
  "interviews":
    [
      {
        "interviewID": 12345,
        "identifier": "a9b3",
        "signature": "1zrd4f"
      },
      {
        "interviewID": 12356,
        "identifier": "3mp8",
        "signature": "bx5t8v"
      }
    ]
}
```

Administering an Interview

Authentication

To be able to administer an interview via the CAT-MH™ API, you must first send the interview credentials in a request to the **interview/signin** web service.

To begin administering an interview, send a **POST** HTTP request to:

<https://www.cat-mh.com/interview/signin>

Request Body

| Parameter | Description |
|-------------|--|
| j_username | Required. The identifier of the created interview. |
| j_password | Required. The signature of the created interview. |
| interviewID | Optional. The interview ID of the created interview. |

Response

If successfully authenticated, the response will have a status code of **302 Found** and the **Location** response header will be <https://www.cat-mh.com/interview/secure/index.html>. Additionally, two HTTP cookies (**JSESSIONID** and **AWSELB**) will be included in the **Set-Cookie** header. You must save the HTTP cookies and include them in the **Cookie** header of every subsequent HTTP request.

Example:

JSESSIONID=ymOPw72ci6jeBibjJq3ca3np.ip-172-31-24-54; path=/interview; secure; HttpOnly

AWSELB=B3BD39AF16F0CF0B7377E928EC0A11EA291D20E9280654915BB0D2B0C64597CFFC8D11A03D
DAA378D175FAFCC8D6F00508243C6EBB8818EFE4B8D60FA4409C8093B13010D6;PATH=

In Progress Interview

When you sign in to take an interview, the interview becomes locked. If you don't [sign out](#) while in the middle of the interview or if the current interview session expires after 30 minutes of inactivity, the interview stays locked. The next time you try to sign in with that interview's credentials the **Location** response header will be <https://www.cat-mh.com/interview/secure/errorInProgress.html>.

To proceed with the interview, send a **POST** HTTP request to:

<https://www.cat-mh.com/interview/secure/breakLock>

NOTE: Include the JSESSIONID and AWSELB cookies in the Cookie header of this request. These HTTP cookies were provided in the Set-Cookie response header of the [authentication request](#).

If successful, the response will have a status code of **302 Found** and the **Location** response header will be <https://www.cat-mh.com/interview/secure/index.html>.

Initializing the Interview

To initialize the interview after having been authenticated, send a **GET** HTTP request to:

<https://www.cat-mh.com/interview/rest/interview>

Request Headers

| Header | Value |
|--------|--|
| Accept | application/json |
| Cookie | JSESSIONID=<JSESSIONID>; AWSELB=<AWSELB> |

*NOTE: Replace <JSESSIONID> and <AWSELB> with the HTTP cookies provided in the **Set-Cookie** response header of the interview authentication request (see [Authentication](#)).*

Response

The response body of a successful request will be a JSON object with the following properties:

| Property | Type | Description |
|------------------|--------|--|
| id | number | The number that uniquely identifies the interview in the CAT-MH™ system. |
| startTime | number | The start of the interview in milliseconds since Unix epoch (i.e., January 1, 1970 midnight UTC/GMT). This value is null if the subject has not answered the first question. |
| endTime | number | The end of the interview in milliseconds since Unix epoch (i.e., January 1, 1970 midnight UTC/GMT). This value is null if the subject has not completed the interview. |
| iter | number | The current question number, starting with 0 for the first question. |
| languageID | number | 1 for English, 2 for Spanish. |
| interviewTests | array | Array of integer test type IDs. |
| conditionalTests | array | This value is null because it was designed to be used by the CAT-MH™ Interview web client. |
| subjectID | number | This value is null because it was designed to be used by the CAT-MH™ Interview web client. |
| displayResults | number | This value is 0 because it was designed to be used by the CAT-MH™ Interview web client. |

If the id value is greater than 0, initialize the screen based on the interview language and request the first question. Otherwise, send a signout request (see [Terminating the Current Interview Session](#)).

Example:

```
{
  "id":12345,
  "startTime":null,
  "endTime":null,
  "iter":0,
  "languageID":1,
  "interviewTests":[1,5],
  "conditionalTests":null,
  "subjectID":null,
  "displayResults":0
}
```

Retrieving a Question

To retrieve the first/next question in the interview, send a **GET** HTTP request to:

<https://www.cat-mh.com/interview/rest/interview/test/question>

Request Headers

| Header | Value |
|--------|--|
| Accept | application/json |
| Cookie | JSESSIONID=<JSESSIONID>; AWSELB=<AWSELB> |

*NOTE: Replace <JSESSIONID> and <AWSELB> with the HTTP cookies provided in the **Set-Cookie** response header of the interview authentication request (see [Authentication](#)).*

Response

The response body of a successful request will be a JSON object with the following properties:

| Property | Type | Description |
|---------------------|--------|--|
| questionID | number | The number that uniquely identifies the question in the CAT-MH™ system. |
| questionNumber | number | The current question number, starting at 0. |
| questionDescription | string | The text to be displayed for this question. |
| questionAnswers | array | A list of JSON objects, each object representing one of the answers for that question (see below). |

| Property | Type | Description |
|-----------------|--------|--|
| questionAudioID | number | A number that can be used to determine which audio file to play when displaying this question. |
| questionSymptom | string | This is null for most questions; when it is not null, it is displayed above the question description and prepended by "Symptom list: " or "Lista de los síntomas:" |

The JSON object that represents a question answer has the following properties:

| Property | Type | Description |
|-------------------|--------|--|
| answerOrdinal | number | The number that indicates the position of this answer in the list of answers for the current question, starting with 1 for the first answer. |
| answerDescription | string | The text to be displayed for this answer. |
| answerWeight | number | A value used in determining how to weigh the subject's response in the algorithm. |

Example:

```
{
  "questionID":14,
  "questionNumber":2,
  "questionDescription":"In the past 2 weeks, how much of the time did you feel depressed?",
  "questionAnswers":[
    {
      "answerOrdinal":1,
      "answerDescription":"None of the time",
      "answerWeight":1.0
    },
    {
      "answerOrdinal":2,
      "answerDescription":"A little of the time",
      "answerWeight":2.0
    },
    {
      "answerOrdinal":3,
      "answerDescription":"Some of the time",
      "answerWeight":3.0
    },
    {
      "answerOrdinal":4,
      "answerDescription":"Most of the time",
      "answerWeight":4.0
    },
    {
      "answerOrdinal":5,
      "answerDescription":"All of the time",
      "answerWeight":5.0
    }
  ],
  "questionAudioID":14,
  "questionSymptom":null
}
```

If questionID is greater than 0, display the question. Otherwise, if the questionID is -1, the interview has been completed and you can send a request to retrieve the interview results (see [Retrieving the Interview Results](#)).

Submitting the Selected Answer

To submit the answer selected by the subject, send a **POST** HTTP request to:

<https://www.cat-mh.com/interview/rest/interview/test/question>

Request Headers

| Header | Value |
|--------------|--|
| Content-Type | application/json |
| Cookie | JSESSIONID=<JSESSIONID>; AWSELB=<AWSELB> |

*NOTE: Replace <JSESSIONID> and <AWSELB> with the HTTP cookies provided in the **Set-Cookie** response header of the interview authentication request (see [Authentication](#)).*

Request Body

The request body should be a JSON object, indicating the current question and the answer selected:

| Property | Type | Description |
|------------|--------|--|
| questionID | number | The number that uniquely identifies the question in the CAT-MH™ system. |
| response | number | The answerOrdinal value of the answer selected by the subject. |
| duration | number | The number of milliseconds from when the question was displayed to when the subject submits an answer. |
| curT1 | number | This value should be 0. |
| curT2 | number | This value should be 0. |
| curT3 | number | This value should be 0. |

Example:

```
{
  "questionID":14,
  "response":2,
  "duration":4492,
  "curT1":0,
  "curT2":0,
  "curT3":0
}
```

Response

If the request was successful, the response will have a status code of **200 OK** and no data will be returned in the response body. Since no error status was returned, request the next question (see [Retrieving a Question](#)).

Retrieving the Interview Results

You can retrieve interview results for the current interview session once the interview is completed. If you request the interview results prior to the completion of the interview, only the results of the tests completed up to that point will be included in the JSON object response.

NOTE: You can only retrieve interview results via the CAT-MH™ API for interviews that have been created using the CAT-MH™ API (see [Creating an Interview](#)) and while the interview credentials remain valid (i.e., during the current interview session prior to signing out).

To retrieve the results for the current interview, send a **GET** HTTP request to:

<https://www.cat-mh.com/interview/rest/interview/results>

To retrieve item responses for each test in the interview, include the optional **itemLevel** query parameter:

<https://www.cat-mh.com/interview/rest/interview/results?itemLevel=1>

NOTE: To explicitly indicate that item level data should not be included in the test results, you can specify `itemLevel=0` in the URL above.

Request Headers

| Header | Value |
|--------------|--|
| Content-Type | application/json |
| Cookie | JSESSIONID=<JSESSIONID>; AWSELB=<AWSELB> |

*NOTE: Replace <JSESSIONID> and <AWSELB> with the HTTP cookies provided in the **Set-Cookie** response header of the interview authentication request (see [Authentication](#)).*

Response

The response body of a successful request will be a JSON object with the following properties:

| Property | Type | Description |
|-------------|--------|--|
| interviewId | number | The number that uniquely identifies the interview in the CAT-MH™ system. |
| subjectId | string | The string that uniquely identifies the subject in the CAT-MH™ system. |

| Property | Type | Description |
|-----------|--------|--|
| startTime | number | The start of the interview in milliseconds since Unix epoch (i.e., January 1, 1970 midnight UTC/GMT). This value is null if the subject has not answered the first question. |
| endTime | number | The end of the interview in milliseconds since Unix epoch (i.e., January 1, 1970 midnight UTC/GMT). This value is null if the subject has not completed the interview. |
| tests | array | A list of JSON objects, each object representing a completed test that is included in the current interview (see below). |

The JSON object that represents a completed test has the following properties:

| Property | Type | Description |
|------------|--------|--|
| type | string | The type of the current test, usually an abbreviation of its test type label. |
| label | string | The name of the current test's type, which is usually displayed on the screen. |
| diagnosis | string | This property only applies to the MDD and C-SSRS test types and it can have the value "negative" or "positive". It is null when it is not applicable for the current test type. |
| confidence | number | This property only applies to the MDD test type and is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. |
| severity | number | This property only applies to the DEP, ANX, M/HM and SS test types and is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. |
| category | string | This property only applies to the DEP, ANX, M/HM and SS test types and is usually a description of the severity. |
| precision | number | This property only applies to the DEP, ANX, M/HM and SS test types and is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. |
| prob | number | This property only applies to the DEP and ANX test types and is a number between 0 and 1 with three decimal places. It is null when it is not applicable for the current test type. |
| percentile | number | This property only applies to the DEP and ANX test types and is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. |

| Property | Type | Description |
|----------|-------|--|
| items | array | A list of JSON objects, each object representing a test item (see below). It is null when item level data was not requested. |

The JSON object that represents a test item has the following properties:

| Property | Type | Description |
|------------|--------|--|
| questionId | number | The number that uniquely identifies the question in the CAT-MH™ system. |
| response | number | The answerOrdinal value of the answer selected by the subject. |
| duration | number | The number of seconds from when the question was displayed to when the subject submitted an answer. This is usually a number with three decimal places. <i>NOTE: If this number is 0.0, the question was answered in a previous test in the current interview and the selected answer was used in the initial setup for the current test.</i> |

Example:

The following is an example of the JSON object included in the response to a request for the results of an interview comprised of all the possible test types and where item level data was not requested:

```
{
  "interviewId":12345,
  "subjectId":"0001",
  "startTime":1484531266930,
  "endTime":1484532455833,
  "tests":[
    {
      "type":"MDD","label":"Major Depressive Disorder","diagnosis":"negative",
      "confidence":96.4,"severity":null,"category":null,"precision":null,"prob":null,
      "percentile":null,"items":null
    },
    {
      "type":"DEP","label":"Depression","diagnosis":null,"confidence":null,"severity":57.9,
      "category":"mild","precision":4.9,"prob":0.921,"percentile":29.5,"items":null
    },
    {
      "type":"ANX","label":"Anxiety Disorder","diagnosis":null,"confidence":null,"severity":22.3,
      "category":"normal","precision":5.2,"prob":0.072,"percentile":3.0,"items":null
    },
    {
      "type":"M/HM","label":"Mania/Hypomania","diagnosis":null,"confidence":null,"severity":54.2,
      "category":"elevated","precision":7.4,"prob":null,"percentile":null,"items":null
    },
    {
      "type":"C-SSRS","label":"C-SSRS Suicide Screen","diagnosis":"negative","confidence":null,
      "severity":null,"category":null,"precision":null,"prob":null,"percentile":null,"items":null
    },
    {
      "type":"SS","label":"Suicide Scale","diagnosis":null,"confidence":null,"severity":65.1,
      "category":"high risk","precision":4.8,"prob":null,"percentile":null,"items":null
    }
  ]
}
```

The following is an example of the JSON object included in the response to a request for the results of an interview comprised of the MDD and DEP test types and where item level data was requested:

```
{
  "interviewId":12346,
  "subjectId":"0002",
  "startTime": 1484538912297,
  "endTime": 1484539170177,
  "tests":[
    {
      "type":"MDD","label":"Major Depressive Disorder","diagnosis":"positive","confidence":99.3,
      "severity":null,"category":null,"precision":null,"prob":null,"percentile":null,
      "items":[{"questionId":925,"response":3,"duration":5.002},
        {"questionId":927,"response":4,"duration":53.666},
        {"questionId":922,"response":5,"duration":8.997},
        {"questionId":924,"response":5,"duration":6.828}
      ]
    },
    {
      "type":"DEP","label":"Depression","diagnosis":null,"confidence":null,"severity":87.5,
      "category":"severe","precision":4.9,"prob":0.999,"percentile":92.5,
      "items":[{"questionId":5,"response":5,"duration":0.0},
        {"questionId":9,"response":3,"duration":0.0},
        {"questionId":16,"response":5,"duration":0.0},
        {"questionId":117,"response":4,"duration":0.0},
        {"questionId":41,"response":4,"duration":56.013},
        {"questionId":240,"response":5,"duration":18.217},
        {"questionId":386,"response":4,"duration":7.611},
        {"questionId":84,"response":5,"duration":35.978},
        {"questionId":384,"response":4,"duration":8.323},
        {"questionId":288,"response":4,"duration":9.088},
        {"questionId":313,"response":4,"duration":10.97},
        {"questionId":279,"response":4,"duration":7.057},
        {"questionId":262,"response":4,"duration":6.165},
        {"questionId":146,"response":5,"duration":9.789},
        {"questionId":341,"response":4,"duration":7.552}
      ]
    }
  ]
}
```

Terminating the Current Interview Session

To terminate the current interview session via the CAT-MH™ API, send a **GET** HTTP request to:

<https://www.cat-mh.com/interview/signout>

Request Headers

| Header | Value |
|--------|--|
| Cookie | JSESSIONID=<JSESSIONID>; AWSELB=<AWSELB> |

*NOTE: Replace <JSESSIONID> and <AWSELB> with the HTTP cookies provided in the **Set-Cookie** response header of the interview authentication request (see [Authentication](#)).*

Response

If successfully signed out, the response will have a status code of **302 Found** and the **Location** response header will be <http://www.cat-mh.com/>. Additionally, a **Set-Cookie** response header will include the JSESSIONID HTTP cookie, indicating that the interview session associated with it has expired.

Example:

| Header | Value |
|------------|---|
| Set-Cookie | JSESSIONID=ymOPw72ci6jeBibJq3ca3np.ip-172-31-24-54; path=/interview; secure; HttpOnly; Max-Age=0; Expires=Thu, 01-Jan-1970 00:00:00 GMT |