



# CAT-MH™ API

Computerized Adaptive Testing - Mental Health

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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), Substance Abuse (sa), C-SSRS Suicide Screen (c-ssrs) or Suicide Scale (ss) for a specified subject. You can create one or more interviews for that 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		For a list of currently available tests, refer to the Test Type column in the table below.
condTestFlags (Optional)	array		[1] if the Depression test should be administered only if the result of the MDD test is Positive; both <b>mdd</b> and <b>dep</b> must be included in the tests array.
complEmailFlag* (Optional)	number		<ul style="list-style-type: none"> <li>• 0 if an email should not be sent upon interview completion (default if not specified).</li> <li>• 1 if a completion email should be sent to the interview creator.</li> <li>• 2 if the completion email should include a summary of test results.</li> </ul>

*\*NOTE: The Automated Creation user account does not usually have an email address associated with it and thus cannot receive emails.*

#### Currently available tests

Test Type	Name
mdd	Major Depressive Disorder
dep	Depression
anx	Anxiety Disorder
m/hm	Mania/Hypomania
p-dep	Depression (Perinatal)
p-anx	Anxiety Disorder (Perinatal)
p-m/hm	Mania/Hypomania (Perinatal)

Test Type	Name
sa	Substance Abuse
ptsd	Post-Traumatic Stress Disorder
c-ssrs	C-SSRS Suicide Screen
ss	Suicide Scale

### Example:

```
{
  "organizationID":1,
  "userFirstName":"Automated",
  "userLastName":"Creation",
  "subjectID":"0001",
  "numberOfInterviews":1,
  "language":1,
  "tests":
    [
      {
        "type":"mdd"
      },
      {
        "type":"dep"
      }
    ],
  "condTestFlags":[1],
  "complEmailFlag":2
}
```

### 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 <b>POST</b> HTTP request to the <b>interview/signin</b> web service in order to administer the interview.

Property	Type	Description
signature*	string	A randomized unique string that can be sent in a <b>POST</b> HTTP request to the <b>interview/signin</b> web service in order to administer the interview.

*\*NOTE: Once an interview is completed, its identifier and signature are deleted from the system.*

### Example:

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

### Retrieving Interview Status Information

You can retrieve information about the status of an interview by sending a single request to the **interview/status** web service.

To retrieve the status of an interview, send a **POST** HTTP request to:

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

### 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

Property	Type	Value	Description
interviewID	number		The number that uniquely identifies the interview in the CAT-MH™ system, as provided in the response to an interview creation request.
identifier*	string		A randomized unique string that can be sent in a <b>POST</b> HTTP request to the <b>interview/signin</b> web service in order to administer the interview.
signature*	string		A randomized unique string that can be sent in a <b>POST</b> HTTP request to the <b>interview/signin</b> web service in order to administer the interview.

*\*NOTE: Once an interview is completed, its identifier and signature are deleted from the system.*

### Example:

```
{
  "organizationID":1,
  "interviewID":12345,
  "identifier ":"a9b3",
  "signature ":"1zrd4f "
}
```

### Response

If the request is successful, the response body is a JSON object with the following properties:

Property	Type	Description
interviewValid	boolean	<ul style="list-style-type: none"> <li>• true if the organizationID and the interviewID provided in the request match an interview in the CAT-MH™ system.</li> <li>• false otherwise.</li> </ul>
credentialsValid	boolean	<ul style="list-style-type: none"> <li>• null if interviewValid is false.</li> <li>• true if the identifier and signature provided in the request match the interview credentials in the CAT-MH™ system.</li> <li>• false if the identifier and signature provided in the request do not match the interview credentials in the CAT-MH™ system, or the interview has been completed.</li> </ul>
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.



Property	Type	Description
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.
inProgress*	boolean	<ul style="list-style-type: none"> <li>• true if the subject is currently taking the interview or the session was not terminated by signing out of the CAT-MH™ system.</li> <li>• false if the subject is not currently taking the interview, or he signed out of the CAT-MH™ system after a previous attempt to take the interview, or the interview was completed.</li> </ul>

*\*NOTE: A value of null is returned in the following circumstances:*

- *interviewValid is false.*
- *the identifier and signature provided in the request do not match the interview credentials in the CAT-MH™ system for an interview that has not been completed.*

### **Example:**

The following JSON object is returned if the organizationID and the interviewID provided in the request match an interview in the CAT-MH™ system, and the identifier and signature also match the interview credentials for an interview that has not been started.

```
{
  "interviewValid":true,
  "credentialsValid":true,
  "startTime":null,
  "endTime":null,
  "inProgress":false
}
```

## **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.



## 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	It can have the value "negative" or "positive". It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
confidence	number	It is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
severity	number	It is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
category	string	It is a description of the severity. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
precision	number	It is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
prob	number	It is a number between 0 and 1 with three decimal places. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.

Property	Type	Description
percentile	number	It is a number between 0 and 100 with one decimal place. It is null when it is not applicable for the current test type. See the table below for a list of test types for which a non-null value is returned.
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>

The following is a list of non-null result properties returned for each test type:

Test Type	Name	Property
mdd	Major Depressive Disorder	diagnosis, confidence
dep	Depression	severity, category, precision, prob, percentile
anx	Anxiety Disorder	severity, category, precision, prob, percentile
m/hm	Mania/Hypomania	severity, category, precision
p-dep	Depression (Perinatal)	severity, category, precision, prob, percentile
p-anx	Anxiety Disorder (Perinatal)	severity, category, precision, prob, percentile
p-m/hm	Mania/Hypomania (Perinatal)	severity, category, precision
sa	Substance Abuse	severity, category, precision (More detailed test results are provided through the Control Panel.)
ptsd	Post-Traumatic Stress Disorder	severity, category, precision
c-ssrs	C-SSRS Suicide Screen	diagnosis

Test Type	Name	Property
ss	Suicide Scale	severity, category, precision

**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 **POST** HTTP request to:

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

*NOTE: The **GET** method for this HTTP request is supported for legacy purposes, but will be deprecated in the future. Notice will be provided before the **GET** method is removed.*

## 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=ymOPw72ci6jeBibjJq3ca3np.ip-172-31-24-54; path=/interview; secure; HttpOnly; Max-Age=0; Expires=Thu, 01-Jan-1970 00:00:00 GMT