

Global Parameters and Traces

Sgp command

The **sgp** command (for Set/Show Global Parameters) is used to query and set the value of global parameters and toggle traces, both interactively and in model files. This is the syntax for its use:

(Sgp {*:parameter value*}* | {*:parameter*}*)

Displaying all Parameter Values

When **sgp** is called without arguments (i.e. (**sgp**)), the list of all global parameters is printed. Each line includes the full name of the parameter, a keyword for use when setting its value with **sgp**, and its current value. The parameters are listed in groups separated by dotted lines, each containing a number of related parameters. All of the parameters are described in detail below.

Obtaining Parameter Value

To print and return the value of some but not all parameters, **sgp** can be called with just the list of those parameter keywords. For example, to print the value of **G** and **Conflict Resolution Trace** one would execute (**sgp :g :crt**). That will print the specified parameters and also return the list of their values.

Setting Parameters and Traces

To set global parameters and traces, call the **sgp** command with the series of parameter keywords followed by the desired value. For example, to set the Goal value **G** to 10.0 and to turn **Activation Trace** on call (**sgp :g 10.0 :act t**). In general, **sgp** will check that the values supplied fall within the required type and range for the parameter, and reject those that don't while printing a warning message.

For the switches, a value of NIL means that the function corresponding to the parameter is disabled. A value of T means that it is enabled. Other types of values that are acceptable for parameters are detailed with the parameters. *Note that values are set as specified and are **NOT** evaluated.*

Available Parameters

Here are all of the global parameters which can be queried or set with sgp. They are detailed in the order that they are displayed by the no parameter form of sgp and the names of the sections are indicated.

Rational Analysis Section

Enable Subsymbolic Computations

keyword: ESC or ERA **default value: NIL**

Enables the subsymbolic computations for activation and expected gain. This was formerly know as the Enable Rational Analysis parameter and can still be set with the ERA keyword, but its use is deprecated.

G

keyword: G **default value: 20.0**

The value of G in the *PG-C* evaluation Must be a positive number.

Expected Gain S

keyword: EGS **default value: NIL**

If enabled, the *S*-value of the Gaussian noise added to the *PG-C* evaluation for each instantiation Must be a positive number. The variance of the noise can be set or accessed as **EGN**.

Enable Randomness

keyword: ER **default value: NIL**

If enabled, ties among instantiations are broken randomly, rather than according to some unspecified but deterministic order.

Utility Threshold

keyword: UT **default value: 0.0**

The threshold for the utility of a production below which it will not be considered during conflict resolution. Setting it to NIL is equivalent to disabling the threshold, i.e. considering all productions.

Activation parameters Section

Goal Activation

keyword: GA **default value: 1.0**

The total level of source activation, i.e. the W_j . That level is divided evenly among chunks in the slot values of the current chunk in the goal buffer. Must be a positive number.

Base Level Constant

keyword: BLC **default value: 0.0**

A constant added to all chunk base levels. Can be any number.

Activation Noise S

keyword: ANS

default value: NIL

If enabled, the S -value of the Gaussian noise added to each chunk activation at every cycle. Must be a positive number. The variance of the noise can be accessed or set as **AN**.

Permanent Activation Noise S

keyword: PAS

default value: NIL

If enabled, the S -value of the Gaussian noise added to each chunk activation at creation. Must be a positive number. The variance of the noise can be accessed or set as **PAN**.

Latency parameters Section

Latency Factor

keyword: LF

default value: 1.0

The multiplicative factor F in the latency equation. Must be a positive number.

Latency Exponent

keyword: LE

default value: 1.0

The exponent factor f in the latency equation. Must be a positive number. [This parameter has been deprecated as of ACT-R 5 and is not shown in the latency equation in the tutorial.]

Default Action Time

keyword: DAT

default value: 0.05

The default action time of a production, i.e. the time between selection and firing. Must be a positive number, usually interpreted in milliseconds.

Partial Matching parameters Section

Partial Matching

keyword: PM

default value: NIL

Enables partial matching.

Mismatch Penalty

keyword: MP

default value: 1.0

This is the match scale parameter P in the activation equation. Must be a positive number.

Maximum Similarity

keyword: MS

default value: 0.0

This is the maximum similarity that can exist between any two chunks. It is the value of a perfect match and is the default similarity between a chunk and itself. Must be a number.

Maximum Difference

keyword: MD default value: -1.0

This is the minimum similarity that can exist between any two chunks. It is the value of a perfect mismatch and is the default similarity between a chunk and any chunk other than itself. Must be a number, and should always be less than or equal to the Maximum similarity but that is currently not enforced by the system.

Maximum Associative Strength

keyword: MAS default value: NIL

When enabled, it is used as the S value in the Sji calculation. It is the theoretical maximum associative strength a chunk could have if it has no associations. This replaces the need to set the internal *wme-number* variable as was done in ACT-R 4 and before.]

Retrieval Threshold

keyword: RT **default value: NIL**

When enabled, chunks with activation levels below this threshold cannot be retrieved. Works with both partial and exact (standard) matching.

Temperature

keyword: TMP **default value: 1.0**

When blending is enabled this parameter is used as the scaling factor. It must be a positive number.

Blending

keyword: BLN **default value: NIL**

When enabled turns on the blending mechanism in ACT-R. Blending is a mechanism that allows for aggregate retrievals. That is, a retrieval request will return a chunk which is not necessarily a specific instance of a chunk from declarative memory, but a weighted aggregation of all the chunks that could be matches.

Learning parameters Section

Optimized Learning

keyword: OL **default value: T**

If enabled, an efficient approximation to the formulas for base level learning is used. May also be set to a positive integer. When it has a numerical value, then a hybrid optimization calculation occurs for base levels. That hybrid calculation is a combination of the specified number of exact presentations in conjunction with the optimized equation for all prior to that subset.

Base Level Learning

keyword: BLL **default value: NIL**

If enabled, used as d in the equation for learning the base level activations of chunks. Must be a positive number, with 0.5 the standard value.

Associative Learning

keyword: AL **default value: NIL**

If enabled, used as $assoc$ in the posterior strength equation for learning the associative strength between pairs of chunks. Must be a positive number.

Strength Learning

keyword: SL

default value: NIL

If enabled, used as d in the equation for learning the strength of productions. Must be a positive number, preferably less than 1.0. Production strengths are deprecated in ACT-R 5.

Parameters Learning

keyword: PL

default value: NIL

If enabled, the parameters p and q will be learned for each production. Can also be set to the decay rate for use in the discounting version of learning equations.

Cost Penalty

keyword: CP

default value: 1.0

When production compilation is enabled, this is the value of the K parameter which is the penalty added to the cost of newly created productions. Must be any number.

Initial Experience

keyword: IE

default value: 10.0

When production compilation is enabled, this is the value of the γ parameter which is used to compute the successes and failures of the newly created productions. Must be any number.

Threshold Time

keyword: TT

default value: 2.0

When production compilation is enabled, this parameter sets the maximum amount of time that can pass between two productions and still allow them to be compiled together. Must be a positive number.

Enable Production Learning

keyword: EPL

default value: NIL

This switch enables the production learning (compilation) mechanism.

Traces Section

These traces are enumerated here roughly in the order they would appear during each production cycle. They can be enabled by being set to T, which sends the trace output to the standard output (Lisp listener), or to any file name, pathname or stream if output is to be directed to another destination.

Exact Matching Trace

keyword: EMT

default value: NIL

If enabled, prints a message during production matching every time a condition is evaluated.

Partial Matching Trace

keyword: PMT

default value: NIL

If enabled, prints messages detailing retrieval requests when **Partial Matching** is enabled.

Production Compilation Trace

keyword: PCT

default value: T

If enabled, prints the main steps of the production compilation process.

Activation Trace

keyword: ACT

default value: NIL

If enabled, prints a trace of the main steps during computation of chunk activation on a retrieval request.

Blending Trace

keyword: BLT

default value: NIL

If enabled, prints messages detailing blending during retrieval requests when **blending** is enabled.

Conflict Resolution Trace

keyword: CRT

default value: NIL

If enabled, prints the name of each production as it is matched during conflict resolution.

Conflict Set Trace

keyword: CST

default value: NIL

If this option is enabled, prints the number of instantiations in the conflict set, and, when subsymbolic computations are enabled, the number of instantiations that were considered and the expected gain of the instantiation that will fire.

Matches Trace

keyword: MT

default value: NIL

If enabled, prints all the instantiations generated. A setting of **SHORT** will simply print the list of variables and their values for each instantiation, and a setting of **T** will print the whole production(s) with the variables replaced by their values.

Production Trace

keyword: PT

default value: NIL

If enabled, prints the selected production instantiation before firing it. A setting of **SHORT** will simply print the list of variables and their values, and a setting of **T** will print the whole production with the variables replaced by their values.

Cycle Trace

keyword: CT

default value: T

If enabled, prints the current time and name of production upon selection and firing.

Latency Trace

keyword: LT

default value: T

If enabled, prints the latency of the action side of the production.

Output Trace

keyword: OT

default value: T

If enabled, prints the output of **!output!** commands on the right-hand side of productions.

Declarative Memory Trace

keyword: DMT

default value: NIL

If enabled, prints a message when a chunk is created, deleted or modified.

Goal Trace

keyword: GT

default value: NIL

If enabled, prints a message when either a new chunk is placed into the goal buffer (a +goal request) or the goal buffer is cleared (a -goal request).

Verbose

keyword: V

default value: T

If enabled, the traces are printed as enabled. If disabled, turns off all trace output regardless of which are enabled. ***Disabling this trace is useful to easily turn off all trace output when running in batch mode where performance is key.***