
ATOMIC
PARAMETERS

ATOMIC PARAMETERS LIST

SKILL	ATOMIC PARAMETER	DEFINITION	EXAMPLES (REMEMBER: VALUES ARE SUBJECTIVE DESIGN DECISIONS)
PRECISION	TARGET SIZE ON SCREEN	Target Size on Screen refers to the size of the zone to target in relation to the screen size (% of screen size).	Game Example: First-person shooter Easy: Target takes up 80% of screen Medium: Target takes up 40% of screen Hard: Target takes up 10% of screen
	DELTA OF TARGET POSITION	Delta of Target Position refers to how grouped together or spread out the targets are on screen.	Game Example: First-person shooter Easy: Distance between targets is 10% of screen Medium: Distance between targets is 30% of screen Hard: Distance between targets is 50% of screen
	TARGET SPEED ON SCREEN	Target Speed on Screen refers to the speed of the zone to target in relation to the screen size (% of screen / second).	Game Example: Combat flight simulator Easy: Target moves across 25% of screen / second Medium: Target moves across 50% of screen / second Hard: Target moves across 75% of screen / second
	TARGET PREDICTABILITY	Target Predictability refers to the level of predictability of the target.	Game Example: Combat flight simulator Easy: Target only moves in 1 direction Medium: Target moves between 3 waypoints Hard: Target movement is chaotic (no predetermined path)
	SHOOTING DURATION	Shooting Duration refers to the amount of time the player has to shoot at the target to destroy it.	Game Example: First-person shooter Easy: 1 second Medium: 3 seconds Hard: 5 seconds

PRECISION	**ANGLE TOLERANCE**	Angle Tolerance refers to how wide or narrow the margin of error is around the required angle the player has to input.	**Game Example:** Flight simulator **Easy:** 90 degrees of error margin to avoid obstacle **Medium**: 60 degrees of error margin to avoid obstacle **Hard:** 30 degrees of error margin to avoid obstacle
TIMING / REFLEX	**ANTICIPATION TIME**	Anticipation Time is the amount of time the player has to prepare before an action.	**Game Example:** Action-Adventure game **Easy:** Enemy takes 3 seconds to swing sword **Medium**: Enemy takes 1 second to swing sword **Hard:** Enemy takes 0.5 seconds to swing sword
	WINDOW OF OPPORTUNITY	Window of Opportunity is the amount of time the player has to avoid a particular danger zone, which can be an obstacle or enemy.	**Game Example:** Racing game **Easy:** Path is clear for 5 seconds **Medium**: Path is clear for 2 seconds **Hard:** Path is clear for 1 second
	TIME TO REACT	Time to React refers to the amount of time the player has to execute the input in response to an unpredictable event.	**Game Example:** Action-Adventure game **Easy:** Player has 3 seconds to execute a response **Medium**: Player has 1 second to execute a response **Hard:** Player has 0.5 seconds to execute a response
DEXTERITY	**INPUT FREQUENCY**	Input Frequency is the amount of inputs per second that the player has to execute.	**Game Example:** Musical rhythm game **Easy:** 1 input per second **Medium**: 2 inputs per second **Hard:** 4 inputs per second
	INPUT CHANGE FREQUENCY	Input Change Frequency is the amount of times per second that the player has to adjust their inputs.	**Game Example:** Musical rhythm game **Easy:** 1 time per second **Medium**: 2 times per second **Hard:** 3 times per second

DEXTERITY	**SEQUENCE COMPLEXITY**	Sequence Complexity refers to the variety of inputs inside a sequence that the player has to execute.	**Game Example:** Musical rhythm game **Easy:** 3 input types **Medium**: 4 input types **Hard:** 5 input types
	NUMBER OF SIMULTANEOUS INPUTS	Number of Simultaneous Inputs refers to the amount of simultaneous inputs the player must execute at a given time.	**Game Example:** Musical rhythm game **Easy:** 2 button chords (2 buttons at once) **Medium**: 3 button chords (3 buttons at once) **Hard:** 4 button chords (4 buttons at once)
MEASUREMENT	**ANALOG ZONE SIZE**	The Analog Zone Size refers to the range in which the player can operate the directional analog stick.	**Game Example:** Snowboarding game **Easy:** Analog stick can move 80% of its range before the character loses balance **Medium**: Analog stick can move 40% of its range before the character loses balance **Hard:** Analog stick can move 10% of its range before the character loses balance
	ANALOG ZONE PLACEMENT	The Analog Zone Placement refers to the placement of the analog stick in a specific range, which is also called the “sweet spot”.	**Game Example:** Snowboarding game **Easy:** Input at or around 0% to maintain balance **Medium**: Input around 0% but can’t be 0% to maintain balance **Hard:** Input somewhere between 0% and 100% to maintain balance
	ANALOG ZONE CHANGE FREQUENCY	Analog Zone Change Frequency refers to how frequent the “sweet spot” (a range of input the player must maintain) changes.	**Game Example:** Snowboarding game **Easy:** 1 time every 5 seconds **Medium**: 1 time per second **Hard:** 2 times per second

MEASUREMENT	**ANALOG AMPLITUDE**	Analog Amplitude refers to how wide or narrow the margin of error is on the amount of pressure the player has to exert on an analog input. (An analog input goes beyond simply detecting if a player made an input or not: it is sensitive to how much pressure the player exerts.) The full range of the analog input (how far you can "press" the input) is called the total Analog Amplitude.	**Game Example:** Fishing game (pulling on a fishing pole to catch a fish) **Easy:** The fishing line will snap if the player's input goes beyond 80% of the total Analog Amplitude **Medium**: The fishing line will snap if the player's input goes beyond 50% of the total Analog Amplitude **Hard:** The fishing line will snap if the player's input goes beyond 25% of the total Analog Amplitude
ENDURANCE	**LENGTH OF INPUT SEQUENCE**	Length of Input Sequence refers to the amount of time during which the player must provide inputs.	**Game example:** Musical rhythm game **Easy:** 3 minute song **Medium:** 5 minute song **Hard:** 8 minute song
MENTAL	**VALIDITY RATIO**	Validity Ratio refers to the proportion of good choices versus wrong choices.	**Game example:** Guessing game **Easy:** 5 good, 1 wrong choices **Medium:** 3 good, 3 wrong choices **Hard:** 1 good, 5 wrong choices
	NUMBER OF CHOICES	Number of Choices refers to the amount of options the player can choose from.	**Game example:** Matching card game **Easy:** 8 cards **Medium:** 16 cards **Hard:** 40 cards

MENTAL	**CONTRAST VS OBVIOUSNESS**	Contrast and Obviousness refers to the ability to distinguish between different responses.	**Game example:** First-person shooter **Easy:** Weak point on target is 50% brighter than the rest **Medium:** Weak point on target is 25% brighter than the rest **Hard:** Weak point on target is 10% brighter than the rest
	TIME	Time refers to how long the player can observe a situation.	**Game example:** Bomb defusing game **Easy:** The bomb has a timer of 15 minutes **Medium:** The bomb has a timer of 3 minutes **Hard:** The bomb has a timer of 1 minute
	KNOWLEDGE LEVEL	Knowledge Level represents different levels of difficulty of the questions asked to the player.	**Game example:** Quiz game **Easy:** Elementary school level knowledge **Medium:** University level knowledge **Hard:** Doctorate level knowledge
	NUMBER OF STEPS	Number of Steps refers to the amount of actions to analyse and/or memorize.	**Game example:** Dance game **Easy:** 1-3 poses to remember and execute **Medium:** 4-7 poses to remember and execute **Hard:** 7 or more poses to remember and execute
	CAPACITY RATIO	Capacity Ratio refers to the amount of required space versus the amount of available space the player has.	**Game example:** Action RPG **Easy:** 90% of the player's inventory is available for storage **Medium:** 50% of the player's inventory is available for storage **Hard:** 20% of the player's inventory is available for storage

MENTAL	**TIME TO MEMORIZE**	Time to Memorize refers to the amount of time the player has to memorize a given amount of information.	**Game example:** Computer hacking game **Easy:** The password (string of 10 numbers) stays on screen for 10 seconds before disappearing **Medium:** The password (string of 10 numbers) stays on screen for 5 seconds before disappearing **Hard:** The password (string of 10 numbers) stays on screen for 3 seconds before disappearing
	INFORMATION RETENTION TIME	Information Retention Time refers to the amount of time the player must keep information in their memory.	**Game example:** Computer hacking game **Easy:** The login password is asked again 10 minutes later **Medium:** The login password is asked again 30 minutes later **Hard:** The login password is asked again 60 minutes later
	NUMBER OF DISTRACTIONS	Number of Distractions refers to the amount of distractions the player needs to deal with. The distractions can be audio (noise, sounds, music), visual (flashes, blocked line of sight), physical (controller vibrations) cues, or a combination of cues.	**Game example:** Hunting game **Easy:** Target bird appears with 2 other birds of the same size **Medium:** Target bird appears with 4 other birds of the same size **Hard:** Target bird appears with 9 other birds of the same size
	CONTRAST OF DISTRACTIONS	Contrast of Distractions refers to the degree to which the distractions hinder the player. The distractions can be audio (noise, sounds, music), visual (flashes, blocked line of sight), physical (controller vibrations) cues, or a combination of cues.	**Game example:** Hunting game **Easy:** The decoy birds are 75% smaller than the target bird **Medium:** The decoy birds are 25% smaller than the target bird **Hard:** The decoy birds are 10% smaller than the target bird

MENTAL	**TIME OF DISTRACTIONS**	Time of Distractions refers to how long the distractions last.	**Game example:** Hunting game **Easy:** Decoy birds fly with the target bird for 5 seconds before splitting off **Medium:** Decoy birds fly with the target bird for 15 seconds before splitting off **Hard:** Decoy birds fly with the target bird for 30 seconds before splitting off
	RISK VS REWARD CONTRAST	Contrast of Risk vs Reward refers to the ability to assess the risk and the rewards associated with decision-making. It is about how hard or how easy it is for the player to make a decision from a cost-benefit angle.	**Game example:** Action RPG **Easy:** Weapon A is 100% better than Weapon B in all stats **Medium:** Weapon A is 30% better than Weapon B in 2 out of 3 stats, but is 30% worse in the remaining stat **Hard:** Weapon A is 10% better than Weapon B in 2 out of 4 stats, but is 10% worse in the other 2 remaining stats
	NUMBER OF ELEMENTS TO MEMORIZE	Number of Elements to Memorize refers to the amount of different elements the player needs to remember.	**Game example:** Memory game **Easy:** The player needs to recall 1 type of elements (numbers) **Medium:** The player needs to recall 3 types of elements (numbers, words and colors) **Hard:** The player needs to recall 7 types of elements (numbers, words, colors, positioning, shapes, timing, order)
SOCIAL	**PARTY SIZE**	Party size refers to how many players have to be coordinated.	**Game example:** MMORPG **Easy:** 3 member party **Medium:** 6 member party **Hard:** 12 member party

SOCIAL	**PARTY LEVEL VS MISSION LEVEL**	Party Level vs Mission Level refers to the difference between the average party level and the level of difficulty of a mission. The average party level is the average of each member's personal character level.	**Game example:** MMORPG **Easy:** Average party level is 3 levels above the mission level **Medium:** Average party level is 1 level above or below the mission level **Hard:** Average party level is 3 levels below the mission level
	PARTY ROLES	Party roles refers to the complementarity of the character's roles for the mission.	**Game example:** MMORPG **Easy:** 2 character classes are recommended for the mission **Medium:** 4 character classes are recommended for the mission **Hard:** 6 character classes are recommended for the mission
	STEPS TO COORDINATE	(Number Of) Steps To Coordinate refers to amount of actions to plan collaboratively in order to complete the mission.	**Game example:** MMORPG **Easy:** 3 objectives to be completed in any order **Medium:** 6 objectives to be completed in partial order **Hard:** 9 objectives to be completed in strict order
	COMMUNICATION TOOLS EFFICIENCY	Communication Efficiency refers to how many channels of communication are available to the players.	**Game example:** MMORPG **Easy:** There are 3 channels of communication (audio, visual, textual) **Medium:** There are 2 channels of communication (visual, textual) **Hard:** There is 1 channel of communication (visual)

VISUALISING % OF SCREEN