

## Temporal Semiotic Units

Temporal Semiotic Units (TSU) were devised in 1992, at the Laboratoire Musique et Informatique de Marseille by a group of composers and artists in plastic arts. Led by François Delalande, the study offers a systematic approach of drawing connections between energy-motion trajectories with music and/or visuals through figurative analogies. The units that have a specific morphological organization, linked to a semiotic meaning. In the table A.1 given below, you can find the nineteen units with their various categories, and their original French terminology along with their English translations.

**Table A.1 :** Temporal Semiotic Units Chart, French Originals and Translations

Unités sémiotiques temporelles (UST)		Temporal Semiotic Units (TSU)	
Invariants		Invariants – Temporarily Unbounded	
Invariants par répétition	Par vagues	Invariant by Repetition	Wave-like (Moving in waves)
	Qui tourne		Turning (Spinning)
	Obsessionnel		Obsessive
Invariants par stagnation	En suspension	Invariant by Stagnation (lack of growth)	In Suspension (Suspended activity)
	Stationnaire		Stationary (Stillness)
	En flottement		Floating
Invariants par effet chaotique	Sans direction par divergence d'information	Invariant by Chaotic Effect	Divergent (Having no direction because the information is too varied)
	Sans direction par excès d'information		Chaotic (Having no direction because there is too much information)
Variants		Variants – Temporarily Bounded	
Variants à évolution uniforme	Qui avance	Variant with a Uniform Development	Moving Forward
	Trajectoire inexorable		Endless (Inexorable) trajectory
	Lourdeur		Heaviness
Variants à évolution contrariée	Sur l'erre	Variant with a Thwarted Development	Fading Away (Inertia)
	Freinage		Halting (Breaking)
	Étirement		Stretching
	Qui veut démarrer		Wanting to start (Unassuaged)
Variants à équilibre rompu	Chute	Variant with a Disrupted Balance	Falling
	Élan		Momentum (Propulsion)
	Contracté-étendu		Contraction-extension (Compressing-stretching out)
	Suspension-interrogation		Suspending-Questioning (Interrogation)

In the following, the nineteen temporal semiotic units are explained in detail together with their morphological and semiotic meanings.

**Temporally Bounded i.e. Time Delimited (Units lasting for a specific amount of time)**

Temporally bounded units last between 1 to 5 seconds, they unfold within very short steps or phrases. The units that are limited by time are categorized as follows:

**Momentum (Propulsion, Accumulative):** Here the energy is swelling i.e. gathered and with an increasing trajectory is initiated and immediately released. The energy is being gathered prior to the initiation of impulse. It has three main phases morphologically:



1. Activating event, could be a sustained, having a slow iteration, or short sound; but most importantly uniform/homogeneous sound, with a sense of gathering and concentration, of energy prior to motion.
2. A brief increase in intensity of any morphological character, is the very first instant of the movement with clear one direction leading to:
3. Decreasing intensity like resonance or silence.

Semantically there is a feeling of a clear gathering and projection of energy at the beginning (either from a steady state or a force) that results in an accelerated motion resulting in an impulse of motion.

\*Disrupted balance

**Moving forward (Propulsion):** This is a one-phase unit that is defined by an uninterrupted propulsive drive. The feeling of being carried, pushed and pulled forwards at a regular pace, progressing purposefully. The movement could have regularly renewed, energy and direction. One phrase, repeated cell with no interruption, and usually contains an accent.



Semantically it gives the feeling of being purposefully pushed forward in a precise direction.

\*Has a uniform development

**Falling:** There is a suspension at the peak of event, with a sudden change in energy that is felt as kinetic energy, with a movement in pitch.



This unit is comprised of two phases morphologically:

1. First phase is homogeneous, and uniform carrying a sense of suspension, even when there is movement within the substance matter.
2. Very brief and sharp transition of the morphology that either goes up or down in pitch in an accelerated movement.

Semantically, there is a feeling of losing of one's own balance, through a sudden change in the state of an equilibrium, that is apt to break. There is a loss of potential energy that turns into kinetic energy. The listener feels suspension or the potential energy that suddenly transforms into kinetic energy (only after this overturn of energy one, becomes aware of suspension). MIM researchers express that the suspension factor is realized after the unit is completed.

\*Disrupted balance

**Stretching (Expansion):** The unit has a single phase, a linear and slow growth of increasing energy of at least one morphological variable of sound. It expresses a process that achieves a topmost level of effort, a maximum of a process. The energy increases and process ends with the deformations of the sound.



Semantically the feeling of taking a process to its limits. There is a feeling of tension that arises from the pull and push of two opposing forces and the pressure is being used to make something longer and wider.

\*Thwarted (prevented) development

**Halting (Breaking, conclusive):** The unit has two phases. There is an already ongoing process that comes across another process which causes decrease of energy.



1. Globally uniform, homogeneous sound
2. By opposition goes under decelerated movement. Progressive and regular decrease of the energy.

Semantically there is a feeling of being forced to slow down or suddenly withheld causing a natural predictable end to the energy of sound, to stop.

\*Thwarted (prevented) development

**Contraction-extension (Compressing stretching out, compressive-expansion-explosion):** The unit has two contrasting phases. The sound material is compressed within local energy then suddenly stretches into a relaxed state, through the diffusion of the energy.



1. During the “compressing” phase, there is an increase in intensity, which could result in rapid events back to back or a dense texture. Has a localized energy. The sound is discontinuous and erratic.
2. The stretching out phase has a stable globally uniform energy. The localized energy of the compression phase acts scattered when released, usually with crescendo.

Semantically, first there is a feeling of compression (as if applying force like strongly pressing on an obstacle), then the barrier is suddenly overcome, resulting in release of resistance and power.

\*Disrupted Balance

**Suspension-interrogation (Suspending-questioning, hesitant):**



The unit is characterized by interruption of motion. It consists of two contrasting phases.

1. The phase is a brief phase, could incorporate any process however usually is characterized by varied and/or repeated sequence, that has either a static continuous state or clear evolution in one direction, without high drive in energy.
2. The second contrasting phase consists of a short pause or a short sustained and rising sound, usually having a decrescendo and/or silence.

The feeling of a movement that is interrupted while waiting within a fixed position, or evolving in a certain direction.

\*Disrupted Balance

**Inertia (Fading Away, slowing):** A unit with a single phase and the process consists of a progressive declining of resonance, deceleration of movement and drowning of energy. There is a constant decrease in intensity or musical activity progressively and rapidly until dissolution, cessation, draining of energy supply.



Semantically MIM researches liken it to a sailing boats trajectory when sailing, even when there is no energy, it keeps on moving because of the momentum. It could be said that there are two somewhat opposite motions, going forward and holding back. However, there is no tension and it has a predictable arch until its non-existent.

\*Thwarted (prevented) development

**Temporally Unbounded i.e. Non time delimited (Invariants; Units lasting for an unknown amount of time)**

Temporally unbound units last for an undefined duration, they are defined by stable parameters and could be comprised of repeated cells. Some of these units have certain properties in common such as stillness or forms of repetition.

**Heaviness:** A unit characterized by slowly paced irregular lengths of cells that repeat. They may or not have strict identical patterns, there is a dissymmetry in the controlled repetition. Each cell has an accent and a crescendo at the beginning; these beginnings somewhat renew the drive of energy. Characterized by slow to moderate tempo.



Semantically although there is a driving energy, the slowness and the feeling of a sense of pull occurring vertically, like gravity, makes it difficult to advance.

\*Has a uniform development

**Inexorable Trajectory (Endless trajectory):** One phase unit, with a globally uniform, linear and usually slow evolution of a never-ending process where one or more variables in the sound's energy are renewed like, intensity, mass, timbre, pitch etc.



Semantically although it is usually directed towards a direction it never seems to come to an end. The MIM researchers point out that the “sound phenomenon must be long enough to be perceived as a process and not an ephemeral event” (Hautbois and others...in end appendix)

\*Has a uniform development

**Obsessive:** One phase unit, that is a persistent pulsed event, and has a quick and insistent repetition; possibly, a varied repetition where each iteration renews its energy with a pulsated energy.



On the semantic level there is a feeling of being constrained by a mechanical, directed, autonomous, constant repeated process; in return does not allow us to act upon.

\*with repetition

**Wavelike (moving in waves):** One phase unit that is characterized by a  cyclical pattern of ebb and flow. There is a slow temporal pace of repetition that is made of an increasing and decreasing pattern. The increase and decrease could be applied to different morphological aspects within the sound, like pitch, dynamic, grain density etc. The pace is from slow to moderate.

There is a feeling of being pushed forward and pulled back, however with a sense of stableness despite the movement.

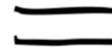
\*with repetition

**Turning (Spinning):** One phase unit, in which one parameter like  pitch, dynamics, and timbre of the sound is being driven by cyclic repetition. The cycles should vary in speed creating irregular paces of speeding up and slowing down. Dynamics function the same way as the cycles do; and there is usually a crescendo and an accent at the peak of crescendo, somewhat like a push at the end of each crescendo to keep turning and spinning.

There is a feeling of an animated object that is turning. Instead of moving forwards there is a feeling of being turned either like an object spinning itself or spinning in space.

\*with repetition

**Stationary (Stillness):** This unit is characterized by a sense of continuity, a globally stable energy with a slow temporal evolution, without purpose or direction. It has a temporal regularity or permanency at a global scale. On the global level although it seems that nothing advances, constant internal activities may appear on other levels. These can include, at another scale, and could be random or pseudo random elements. MIM researchers define various configurations of how this activity could take place:



1. Random details within the global stillness. Here the detailed events could be diverse and almost random as well as in the form of repeated cells that are structured. Even if we can hear a pulse, no place is aimed and the time seems to stay always the same.
2. Cells that behave as slow cycles with little variety, slow tempo with permanent regularity.
3. Temporal structure and the evolutionary frame are barely altered or changed.

The feeling of something is happening, it is standing still as it does not go anywhere, and does not cause expectation. However, it is not as if one is waiting as there is a constant happening, that goes nowhere.

\*Stagnation

**Wanting to start (Unassuaged, Inertial):** There are various sounds, attempting to begin moving, trying to initiate motion. This unit is made of two repeated phases that carries a form of reiteration implying an effort to commence, initiate an action. The reiteration occurs is not same and varies each time.



1. First phase is relatively short and has a shape that is described as “articulate” by MIM researchers.
2. The second phase acts contrary to the first through one or more parameters of the sound, could be in forms of silence, suspension, holding back, pushing back etc.

There is a feeling of unease that is caused by the effort to initiate the flow action, however not succeeding in doing so.

\*Thwarted (prevented) development

**Floating:** Unit with slow temporal evolution that is characterized with short sounds that are irregular, random, temporary and disjointed (without a pattern) that flow lightly and airy continuously over a background layer. This continuum can be could be another layer, implied layer or just silence.



The feeling that the sound events are flowing continuously and the sound events appear and disappear without a pulse, on a smooth and even continuum; devoid of suspense and expectation.

\*Stagnation

**In suspension (suspended activity):** Hanging in expectation for an unknown event. This unit has a no or slow progression and has repeated cells that have no or very little variations implying a sense of just simply being, a form of floating in space without much action and a clear directionality.



There is a feeling of opposing tensions of equal strength have brought everything to a standstill. This implies not a relief but on the contrary a sense of waiting and expectation for something to happen within suspension, without knowing when or what will be happening.

\*Stagnation

**Divergent (Without direction by divergence, entropic):** The unit is comprised of short sound units or sequences that have little or no relation with one another. Having no direction because the information is too varied. These events do not overlap have different directions, and no apparent connection; however, exist in a globally uniform environment. The energy of motion is a potential energy that is not directed and expressed within one movement.



There is a feeling of indecision and general immobility caused by encountering too many possible directions with successive (not simultaneous) motion, including contradictory direction with no apparent connection.

\*Chaotic Effect

**Chaotic (Without direction by excess of information):** The unit has an abundance of information by sound units or sequences that are not particularly related, could be contradictory and have various directionalities. There is no general directionality because of abundance of information, that have high mobility happening internally and possible simultaneously. The characteristic of this unit is that these events build in the texture, overlapping and layering one another creating dense environments.



There is a feeling of tension and confusion caused by encountering too many possible directions which results in indecisiveness and a lack of causality.

\*Chaotic Effect