The Composition Engine

This PDF documents each section of the Creativity Support Tool I designed and used in the writing, recording, and production of the music submitted in this portfolio.

The Composition Engine centres around a model of creativity synthesised from my research and is intended to act as both map and guide to the creative process. The tool is made up of cards that can be used as stimuli providers and process guides, designed to interrupt a user's creative process, to ‘provoke the muse’, and introduce elements of randomness and serendipity into the act of composition. How (or even if) the suggestions are incorporated into the work is entirely up to the user. I have had success using it on an *ad hoc* basis when stuck or blocked but also have used it in a more linear and structured manner, stage-by-stage. Other options include creating an ‘ingredients list’ or pre-compositional form for a piece as a starting point and consulting The Composition Engine only when more raw materials are needed. Towards the end of the document, there is a section that offers some ideas for how to use it in a more game-like fashion.

Locating oneself within the model and identifying where a suggestion or prompt might be of use, then rolling a dice or generating a random number to ‘choose’ from the options became the main way I made use of the system, as a way of ‘drawing the sortes’. See the included commentary for further details.

A complete version of The Composition Engine that allows panning and zooming is available here:

https://jamesgordonmusic.com/the-composition-engine

or:

https://sharecanvas.io/p/the-composition-engine

The Composition Engine Model

The four overarching *stages* of creativity used in the model are:

1. Preparation
2. Generation
3. Iteration
4. Evaluation

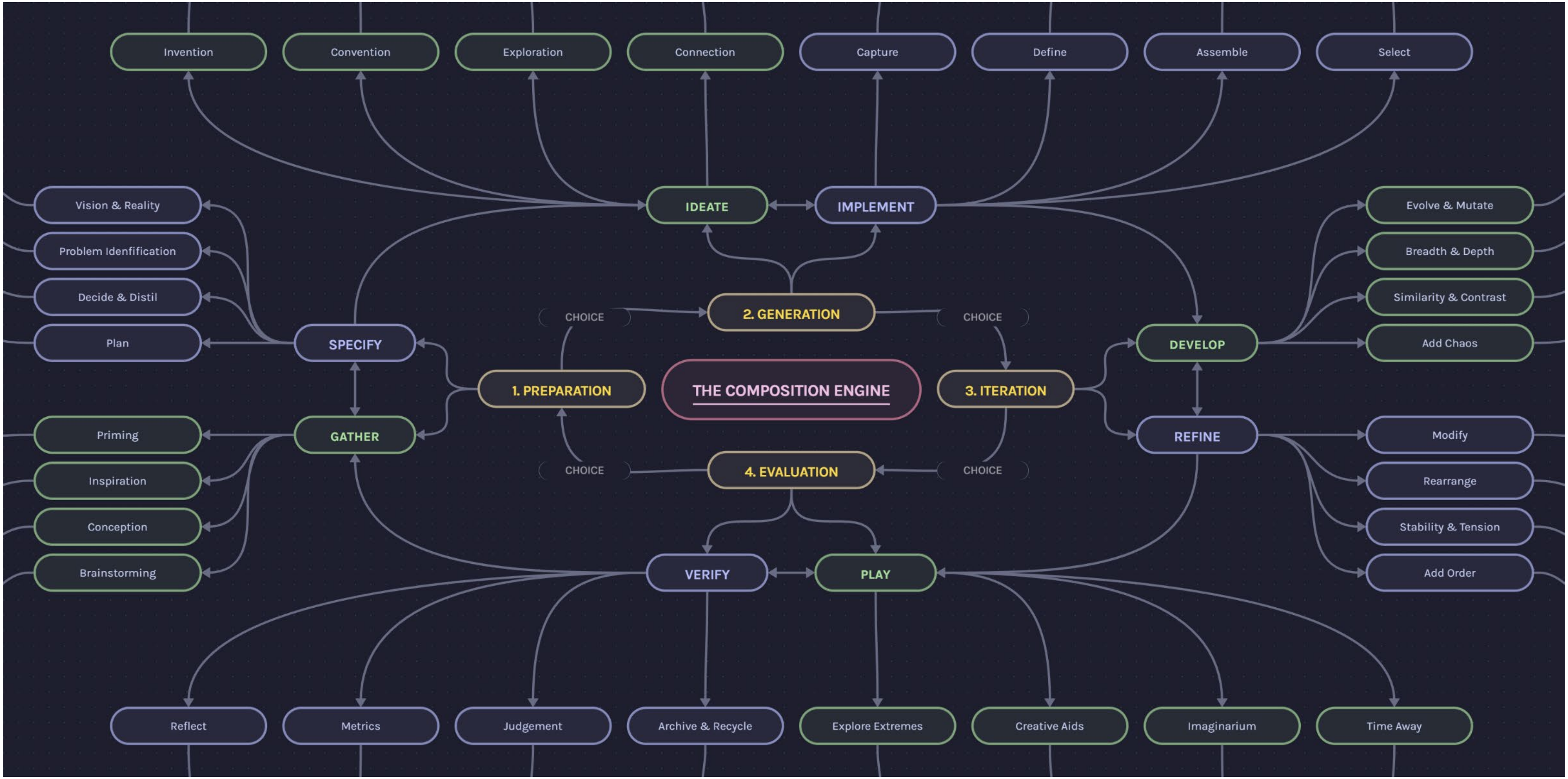
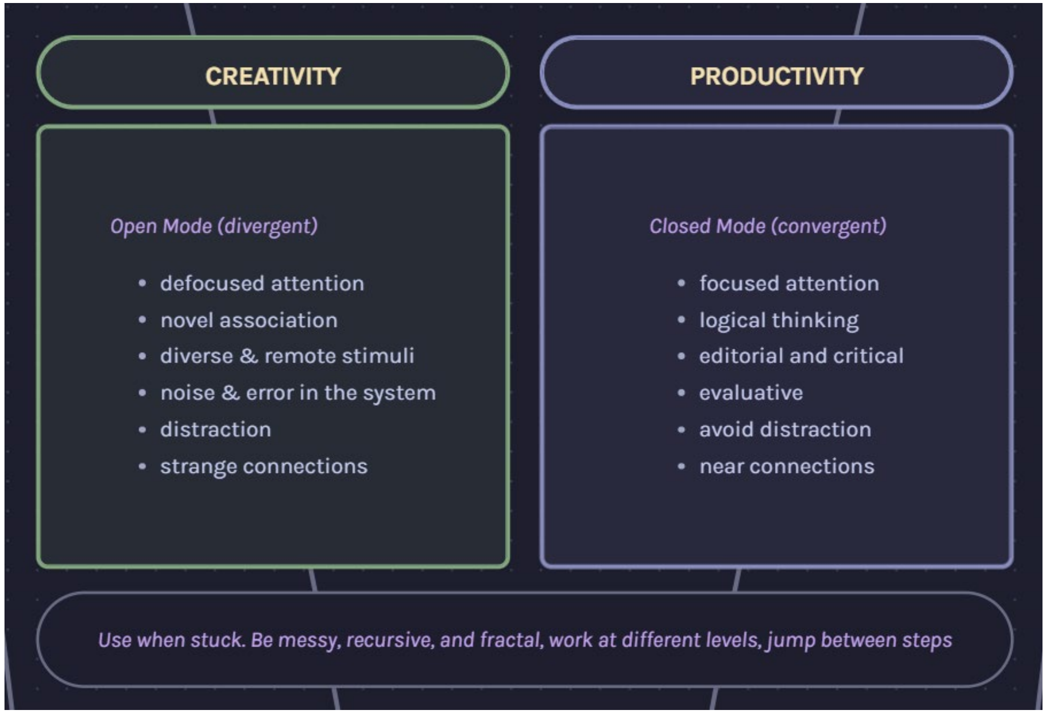

Invention
Convention
Exploration
Connection
Capture
Define
Assemble
Select
Vision & Reality
Problem Idenfification
Decide & Distil
Plan
IDEATE
IMPLEMENT
Evolve & Mutate
Breadth & Depth
Similarity & Contrast
Add Chaos
CHOICE
2. GENERATION
CHOICE
SPECIFY
DEVELOP
1. PREPARATION
THE COMPOSITION ENGINE
3. ITERATION
GATHER
REFINE
Priming
Inspiration
Conception
Brainstorming
CHOICE
4. EVALUATION
CHOICE
Modify
Rearrange
Stability & Tension
Add Order
VERIFY
PLAY
Reflect
Metrics
Judgement
Archive & Recycle
Explore Extremes
Creative Aids
Imaginarium
Time Away

Fig. 1 - The Composition Engine Creativity Support Tool (CST) and Model

Each *stage* (fig.3) contains two *modes* of work, divergent and convergent (fig.2):

- **Preparation**: *Gather* | *Specify*
- **Generation**: *Ideas* | *Implement*
- **Iteration**: *Develop* | *Refine*
- **Evaluation**: *Play* | *Verify*

Each *mode* contains four *phases* of activities that can be undertaken (fig.4). These provide a description of the *phase*, some ideas for how to work within it (e.g. creating pre-inventive forms in the 'Decide & Distil' *phase*), and some notes and references for further reading.



CREATIVITY

Open Mode (divergent)

- defocused attention
- novel association
- diverse & remote stimuli
- noise & error in the system
- distraction
- strange connections

PRODUCTIVITY

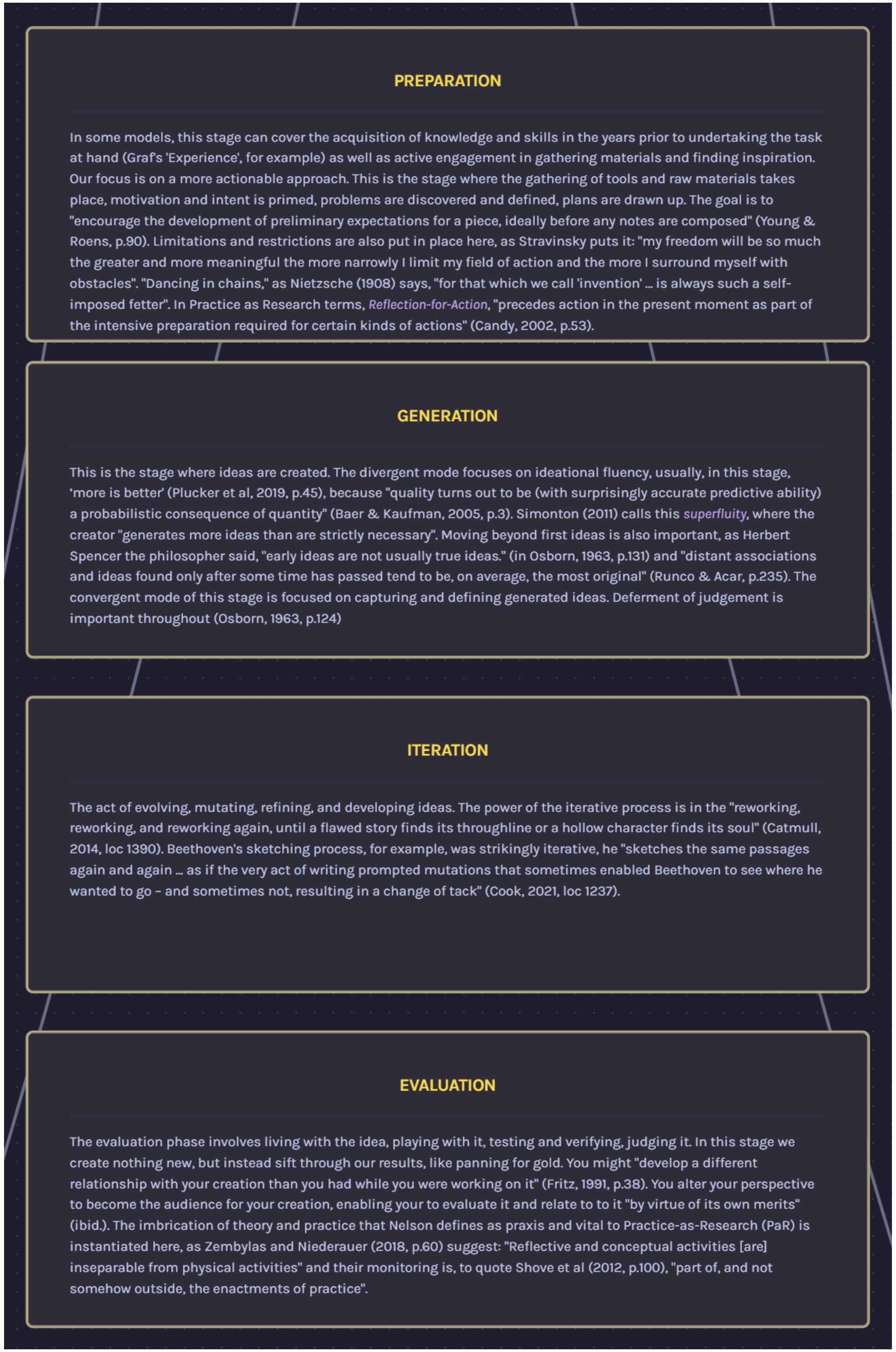
Closed Mode (convergent)

- focused attention
- logical thinking
- editorial and critical
- evaluative
- avoid distraction
- near connections

Use when stuck. Be messy, recursive, and fractal, work at different levels, jump between steps

Fig. 2 - Divergent & Convergent modes and usage suggestion (above)

Fig. 3 - Preparation, Generation, Iteration, Evaluation (right)



PREPARATION

In some models, this stage can cover the acquisition of knowledge and skills in the years prior to undertaking the task at hand (Graf's 'Experience', for example) as well as active engagement in gathering materials and finding inspiration. Our focus is on a more actionable approach. This is the stage where the gathering of tools and raw materials takes place, motivation and intent is primed, problems are discovered and defined, plans are drawn up. The goal is to "encourage the development of preliminary expectations for a piece, ideally before any notes are composed" (Young & Roens, p.90). Limitations and restrictions are also put in place here, as Stravinsky puts it: "my freedom will be so much the greater and more meaningful the more narrowly I limit my field of action and the more I surround myself with obstacles". "Dancing in chains," as Nietzsche (1908) says, "for that which we call 'invention' ... is always such a self-imposed fetter". In Practice as Research terms, *Reflection-for-Action*, "precedes action in the present moment as part of the intensive preparation required for certain kinds of actions" (Candy, 2002, p.53).

GENERATION

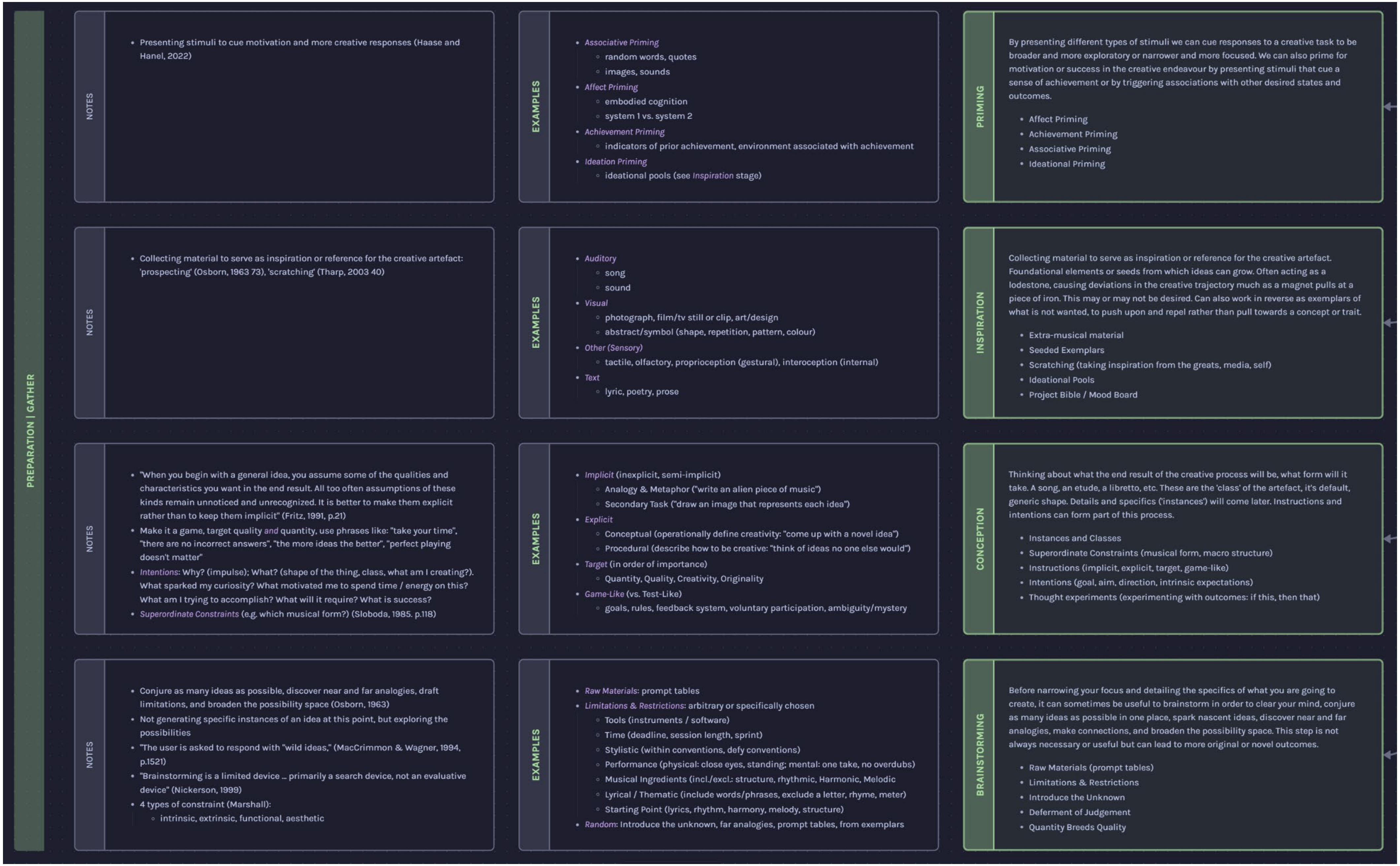
This is the stage where ideas are created. The divergent mode focuses on ideational fluency, usually, in this stage, 'more is better' (Plucker et al, 2019, p.45), because "quality turns out to be (with surprisingly accurate predictive ability) a probabilistic consequence of quantity" (Baer & Kaufman, 2005, p.3). Simonton (2011) calls this *superfluity*, where the creator "generates more ideas than are strictly necessary". Moving beyond first ideas is also important, as Herbert Spencer the philosopher said, "early ideas are not usually true ideas." (in Osborn, 1963, p.131) and "distant associations and ideas found only after some time has passed tend to be, on average, the most original" (Runco & Acar, p.235). The convergent mode of this stage is focused on capturing and defining generated ideas. Deferment of judgement is important throughout (Osborn, 1963, p.124)

ITERATION

The act of evolving, mutating, refining, and developing ideas. The power of the iterative process is in the "reworking, reworking, and reworking again, until a flawed story finds its throughline or a hollow character finds its soul" (Catmull, 2014, loc 1390). Beethoven's sketching process, for example, was strikingly iterative, he "sketches the same passages again and again ... as if the very act of writing prompted mutations that sometimes enabled Beethoven to see where he wanted to go – and sometimes not, resulting in a change of tack" (Cook, 2021, loc 1237).

EVALUATION

The evaluation phase involves living with the idea, playing with it, testing and verifying, judging it. In this stage we create nothing new, but instead sift through our results, like panning for gold. You might "develop a different relationship with your creation than you had while you were working on it" (Fritz, 1991, p.38). You alter your perspective to become the audience for your creation, enabling your to evaluate it and relate to to it "by virtue of its own merits" (ibid.). The imbrication of theory and practice that Nelson defines as praxis and vital to Practice-as-Research (PaR) is instantiated here, as Zembylas and Niederauer (2018, p.60) suggest: "Reflective and conceptual activities [are] inseparable from physical activities" and their monitoring is, to quote Shove et al (2012, p.100), "part of, and not somehow outside, the enactments of practice".



PREPARATION | GATHER

NOTES

- Presenting stimuli to cue motivation and more creative responses (Haase and Hanel, 2022)

EXAMPLES

- *Associative Priming*
    - random words, quotes
    - images, sounds
- *Affect Priming*
    - embodied cognition
    - system 1 vs. system 2
- *Achievement Priming*
    - indicators of prior achievement, environment associated with achievement
- *Ideation Priming*
    - ideational pools (see *Inspiration* stage)

PRIMING

By presenting different types of stimuli we can cue responses to a creative task to be broader and more exploratory or narrower and more focused. We can also prime for motivation or success in the creative endeavour by presenting stimuli that cue a sense of achievement or by triggering associations with other desired states and outcomes.

- Affect Priming
- Achievement Priming
- Associative Priming
- Ideational Priming

NOTES

- Collecting material to serve as inspiration or reference for the creative artefact: 'prospecting' (Osborn, 1963 73), 'scratching' (Tharp, 2003 40)

EXAMPLES

- *Auditory*
    - song
    - sound
- *Visual*
    - photograph, film/tv still or clip, art/design
    - abstract/symbol (shape, repetition, pattern, colour)
- *Other (Sensory)*
    - tactile, olfactory, proprioception (gestural), interoception (internal)
- *Text*
    - lyric, poetry, prose

INSPIRATION

Collecting material to serve as inspiration or reference for the creative artefact. Foundational elements or seeds from which ideas can grow. Often acting as a lodestone, causing deviations in the creative trajectory much as a magnet pulls at a piece of iron. This may or may not be desired. Can also work in reverse as exemplars of what is not wanted, to push upon and repel rather than pull towards a concept or trait.

- Extra-musical material
- Seeded Exemplars
- Scratching (taking inspiration from the greats, media, self)
- Ideational Pools
- Project Bible / Mood Board

NOTES

- "When you begin with a general idea, you assume some of the qualities and characteristics you want in the end result. All too often assumptions of these kinds remain unnoticed and unrecognized. It is better to make them explicit rather than to keep them implicit" (Fritz, 1991, p.21)
- Make it a game, target quality *and* quantity, use phrases like: "take your time", "there are no incorrect answers", "the more ideas the better", "perfect playing doesn't matter"
- *Intentions*: Why? (impulse); What? (shape of the thing, class, what am I creating?). What sparked my curiosity? What motivated me to spend time / energy on this? What am I trying to accomplish? What will it require? What is success?
- *Superordinate Constraints* (e.g. which musical form?) (Sloboda, 1985. p.118)

EXAMPLES

- *Implicit* (inexplicit, semi-implicit)
    - Analogy & Metaphor ("write an alien piece of music")
    - Secondary Task ("draw an image that represents each idea")
- *Explicit*
    - Conceptual (operationally define creativity: "come up with a novel idea")
    - Procedural (describe how to be creative: "think of ideas no one else would")
- *Target* (in order of importance)
    - Quantity, Quality, Creativity, Originality
- *Game-Like* (vs. Test-Like)
    - goals, rules, feedback system, voluntary participation, ambiguity/mystery

CONCEPTION

Thinking about what the end result of the creative process will be, what form will it take. A song, an etude, a libretto, etc. These are the 'class' of the artefact, it's default, generic shape. Details and specifics ('instances') will come later. Instructions and intentions can form part of this process.

- Instances and Classes
- Superordinate Constraints (musical form, macro structure)
- Instructions (implicit, explicit, target, game-like)
- Intentions (goal, aim, direction, intrinsic expectations)
- Thought experiments (experimenting with outcomes: if this, then that)

NOTES

- Conjure as many ideas as possible, discover near and far analogies, draft limitations, and broaden the possibility space (Osborn, 1963)
- Not generating specific instances of an idea at this point, but exploring the possibilities
- "The user is asked to respond with "wild ideas," (MacCrimmon & Wagner, 1994, p.1521)
- "Brainstorming is a limited device … primarily a search device, not an evaluative device" (Nickerson, 1999)
- 4 types of constraint (Marshall):
    - intrinsic, extrinsic, functional, aesthetic

EXAMPLES

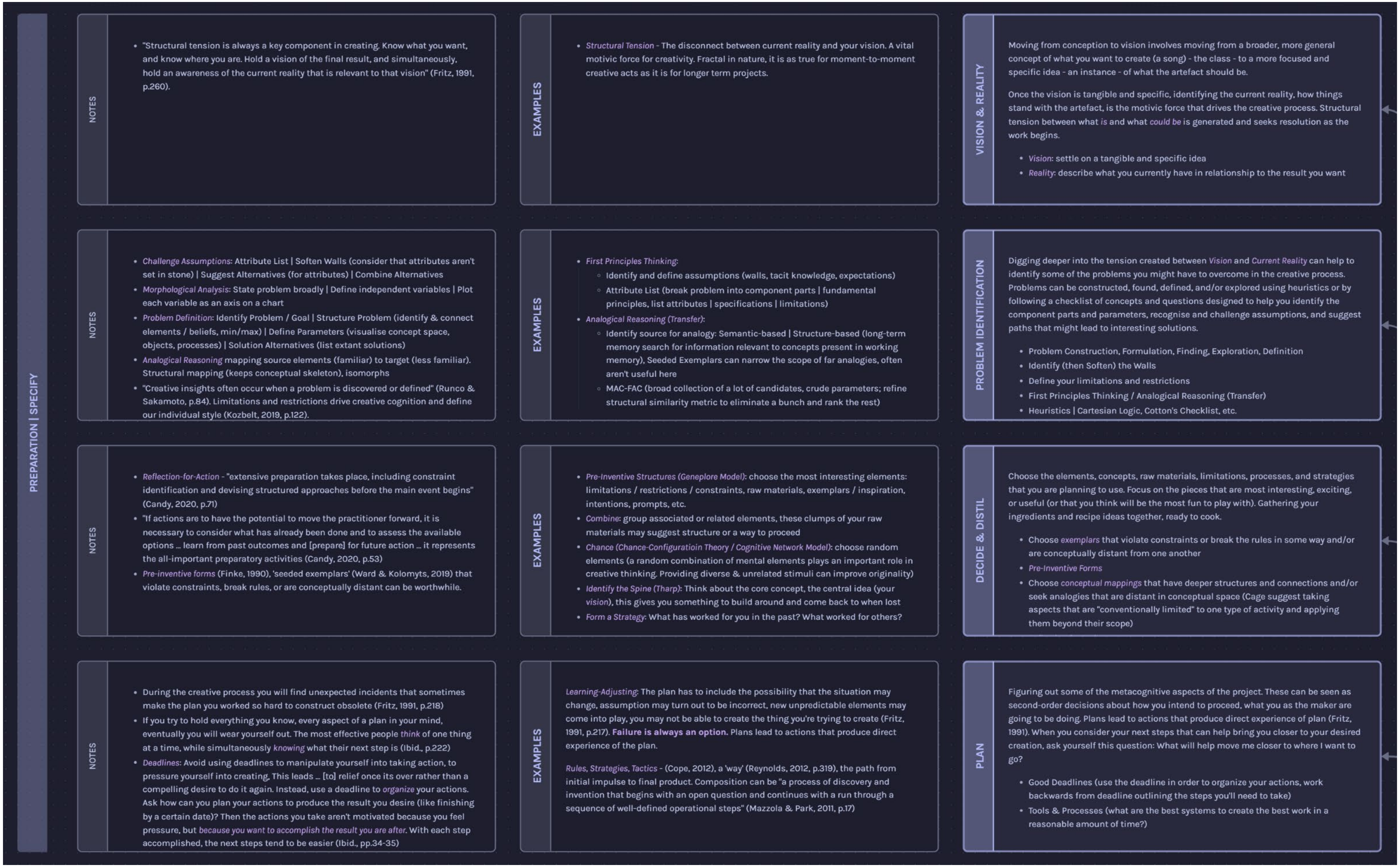
- *Raw Materials*: prompt tables
- *Limitations & Restrictions*: arbitrary or specifically chosen
    - Tools (instruments / software)
    - Time (deadline, session length, sprint)
    - Stylistic (within conventions, defy conventions)
    - Performance (physical: close eyes, standing; mental: one take, no overdubs)
    - Musical Ingredients (incl./excl.: structure, rhythmic, Harmonic, Melodic
    - Lyrical / Thematic (include words/phrases, exclude a letter, rhyme, meter)
    - Starting Point (lyrics, rhythm, harmony, melody, structure)
- *Random*: Introduce the unknown, far analogies, prompt tables, from exemplars

BRAINSTORMING

Before narrowing your focus and detailing the specifics of what you are going to create, it can sometimes be useful to brainstorm in order to clear your mind, conjure as many ideas as possible in one place, spark nascent ideas, discover near and far analogies, make connections, and broaden the possibility space. This step is not always necessary or useful but can lead to more original or novel outcomes.

- Raw Materials (prompt tables)
- Limitations & Restrictions
- Introduce the Unknown
- Deferment of Judgement
- Quantity Breeds Quality

Fig. 4 - Preparation | Gather (Brainstorming, Conception, Inspiration, Priming)



PREPARATION | SPECIFY

NOTES

- "Structural tension is always a key component in creating. Know what you want, and know where you are. Hold a vision of the final result, and simultaneously, hold an awareness of the current reality that is relevant to that vision" (Fritz, 1991, p.260).

EXAMPLES

- *Structural Tension* - The disconnect between current reality and your vision. A vital motivic force for creativity. Fractal in nature, it is as true for moment-to-moment creative acts as it is for longer term projects.

VISION & REALITY

Moving from conception to vision involves moving from a broader, more general concept of what you want to create (a song) - the class - to a more focused and specific idea - an instance - of what the artefact should be.

Once the vision is tangible and specific, identifying the current reality, how things stand with the artefact, is the motivic force that drives the creative process. Structural tension between what *is* and what *could be* is generated and seeks resolution as the work begins.

- *Vision*: settle on a tangible and specific idea
- *Reality*: describe what you currently have in relationship to the result you want

NOTES

- *Challenge Assumptions*: Attribute List | Soften Walls (consider that attributes aren't set in stone) | Suggest Alternatives (for attributes) | Combine Alternatives
- *Morphological Analysis*: State problem broadly | Define independent variables | Plot each variable as an axis on a chart
- *Problem Definition*: Identify Problem / Goal | Structure Problem (identify & connect elements / beliefs, min/max) | Define Parameters (visualise concept space, objects, processes) | Solution Alternatives (list extant solutions)
- *Analogical Reasoning* mapping source elements (familiar) to target (less familiar). Structural mapping (keeps conceptual skeleton), isomorphs
- "Creative insights often occur when a problem is discovered or defined" (Runco & Sakamoto, p.84). Limitations and restrictions drive creative cognition and define our individual style (Kozbelt, 2019, p.122).

EXAMPLES

- *First Principles Thinking*:
  - Identify and define assumptions (walls, tacit knowledge, expectations)
  - Attribute List (break problem into component parts | fundamental principles, list attributes | specifications | limitations)
- *Analogical Reasoning (Transfer)*:
  - Identify source for analogy: Semantic-based | Structure-based (long-term memory search for information relevant to concepts present in working memory), Seeded Exemplars can narrow the scope of far analogies, often aren't useful here
  - MAC-FAC (broad collection of a lot of candidates, crude parameters; refine structural similarity metric to eliminate a bunch and rank the rest)

PROBLEM IDENTIFICATION

Digging deeper into the tension created between *Vision* and *Current Reality* can help to identify some of the problems you might have to overcome in the creative process. Problems can be constructed, found, defined, and/or explored using heuristics or by following a checklist of concepts and questions designed to help you identify the component parts and parameters, recognise and challenge assumptions, and suggest paths that might lead to interesting solutions.

- Problem Construction, Formulation, Finding, Exploration, Definition
- Identify (then Soften) the Walls
- Define your limitations and restrictions
- First Principles Thinking / Analogical Reasoning (Transfer)
- Heuristics | Cartesian Logic, Cotton's Checklist, etc.

NOTES

- *Reflection-for-Action* - "extensive preparation takes place, including constraint identification and devising structured approaches before the main event begins" (Candy, 2020, p.71)
- "If actions are to have the potential to move the practitioner forward, it is necessary to consider what has already been done and to assess the available options … learn from past outcomes and [prepare] for future action … it represents the all-important preparatory activities (Candy, 2020, p.53)
- *Pre-inventive forms* (Finke, 1990), 'seeded exemplars' (Ward & Kolomyts, 2019) that violate constraints, break rules, or are conceptually distant can be worthwhile.

EXAMPLES

- *Pre-Inventive Structures (Geneplore Model)*: choose the most interesting elements: limitations / restrictions / constraints, raw materials, exemplars / inspiration, intentions, prompts, etc.
- *Combine*: group associated or related elements, these clumps of your raw materials may suggest structure or a way to proceed
- *Chance (Chance-Configuratioin Theory / Cognitive Network Model)*: choose random elements (a random combination of mental elements plays an important role in creative thinking. Providing diverse & unrelated stimuli can improve originality)
- *Identify the Spine (Tharp)*: Think about the core concept, the central idea (your *vision*), this gives you something to build around and come back to when lost
- *Form a Strategy*: What has worked for you in the past? What worked for others?

DECIDE & DISTIL

Choose the elements, concepts, raw materials, limitations, processes, and strategies that you are planning to use. Focus on the pieces that are most interesting, exciting, or useful (or that you think will be the most fun to play with). Gathering your ingredients and recipe ideas together, ready to cook.

- Choose *exemplars* that violate constraints or break the rules in some way and/or are conceptually distant from one another
- *Pre-Inventive Forms*
- Choose *conceptual mappings* that have deeper structures and connections and/or seek analogies that are distant in conceptual space (Cage suggest taking aspects that are "conventionally limited" to one type of activity and applying them beyond their scope)

NOTES

- During the creative process you will find unexpected incidents that sometimes make the plan you worked so hard to construct obsolete (Fritz, 1991, p.218)
- If you try to hold everything you know, every aspect of a plan in your mind, eventually you will wear yourself out. The most effective people *think* of one thing at a time, while simultaneously *knowing* what their next step is (Ibid., p.222)
- *Deadlines*: Avoid using deadlines to manipulate yourself into taking action, to pressure yourself into creating. This leads … [to] relief once its over rather than a compelling desire to do it again. Instead, use a deadline to *organize* your actions. Ask how can you plan your actions to produce the result you desire (like finishing by a certain date)? Then the actions you take aren't motivated because you feel pressure, but *because you want to accomplish the result you are after*. With each step accomplished, the next steps tend to be easier (Ibid., pp.34-35)

EXAMPLES

Learning-Adjusting: The plan has to include the possibility that the situation may change, assumption may turn out to be incorrect, new unpredictable elements may come into play, you may not be able to create the thing you're trying to create (Fritz, 1991, p.217). **Failure is always an option.** Plans lead to actions that produce direct experience of the plan.

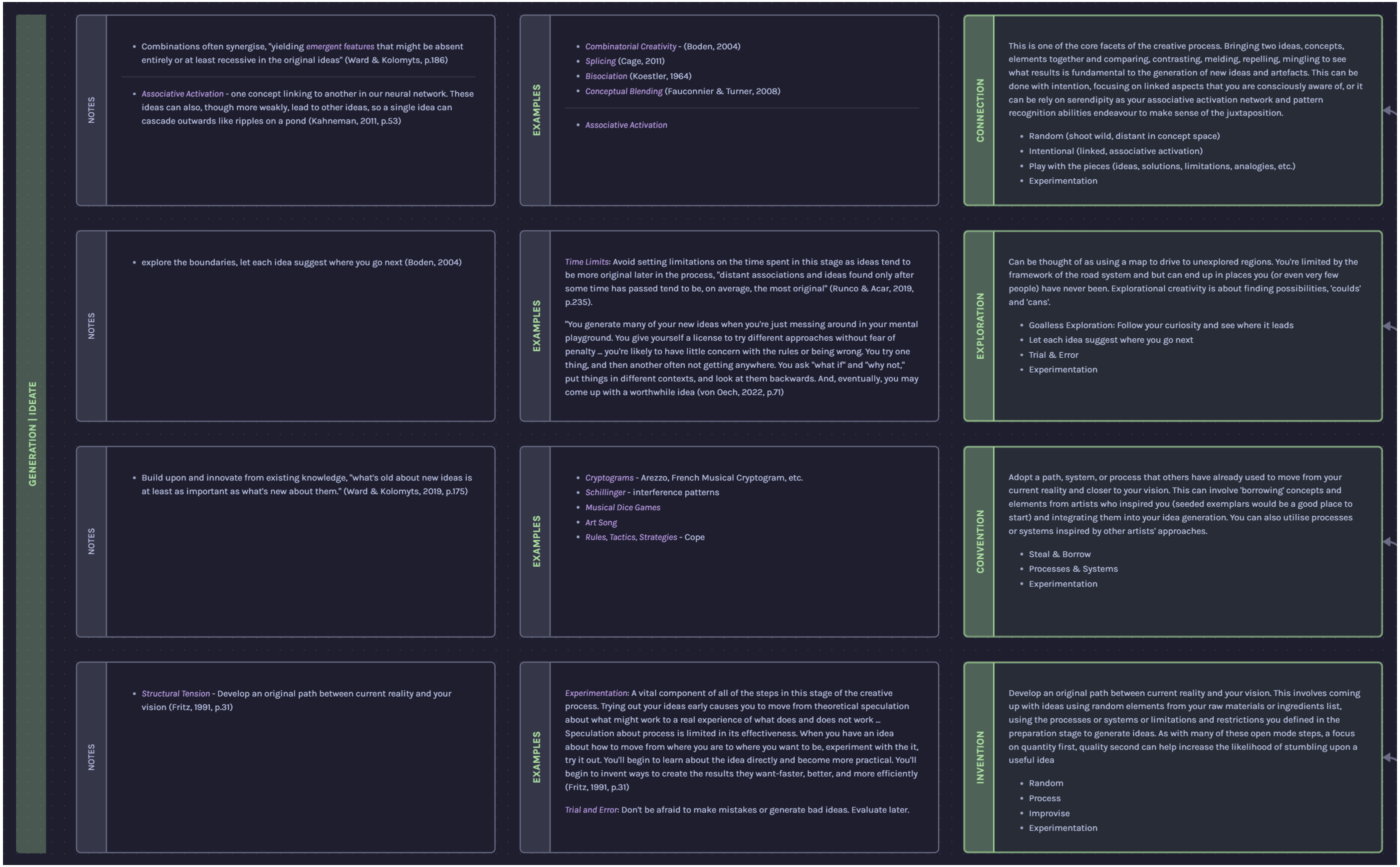
Rules, Strategies, Tactics - (Cope, 2012), a 'way' (Reynolds, 2012, p.319), the path from initial impulse to final product. Composition can be "a process of discovery and invention that begins with an open question and continues with a run through a sequence of well-defined operational steps" (Mazzola & Park, 2011, p.17)

PLAN

Figuring out some of the metacognitive aspects of the project. These can be seen as second-order decisions about how you intend to proceed, what you as the maker are going to be doing. Plans lead to actions that produce direct experience of plan (Fritz, 1991). When you consider your next steps that can help bring you closer to your desired creation, ask yourself this question: What will help move me closer to where I want to go?

- Good Deadlines (use the deadline in order to organize your actions, work backwards from deadline outlining the steps you'll need to take)
- Tools & Processes (what are the best systems to create the best work in a reasonable amount of time?)

Fig. 5 - Preparation | Specify (Vision & Reality, Problem Identification, Decide & Distil, Plan)



GENERATION | IDEATE

NOTES

- Combinations often synergise, "yielding *emergent features* that might be absent entirely or at least recessive in the original ideas" (Ward & Kolomyts, p.186)

- *Associative Activation* - one concept linking to another in our neural network. These ideas can also, though more weakly, lead to other ideas, so a single idea can cascade outwards like ripples on a pond (Kahneman, 2011, p.53)

EXAMPLES

- *Combinatorial Creativity* - (Boden, 2004)
- *Splicing* (Cage, 2011)
- *Bisociation* (Koestler, 1964)
- *Conceptual Blending* (Fauconnier & Turner, 2008)

- *Associative Activation*

CONNECTION

This is one of the core facets of the creative process. Bringing two ideas, concepts, elements together and comparing, contrasting, melding, repelling, mingling to see what results is fundamental to the generation of new ideas and artefacts. This can be done with intention, focusing on linked aspects that you are consciously aware of, or it can be rely on serendipity as your associative activation network and pattern recognition abilities endeavour to make sense of the juxtaposition.

- Random (shoot wild, distant in concept space)
- Intentional (linked, associative activation)
- Play with the pieces (ideas, solutions, limitations, analogies, etc.)
- Experimentation

NOTES

- explore the boundaries, let each idea suggest where you go next (Boden, 2004)

EXAMPLES

Time Limits: Avoid setting limitations on the time spent in this stage as ideas tend to be more original later in the process, "distant associations and ideas found only after some time has passed tend to be, on average, the most original" (Runco & Acar, 2019, p.235).

"You generate many of your new ideas when you're just messing around in your mental playground. You give yourself a license to try different approaches without fear of penalty ... you're likely to have little concern with the rules or being wrong. You try one thing, and then another often not getting anywhere. You ask "what if" and "why not," put things in different contexts, and look at them backwards. And, eventually, you may come up with a worthwhile idea (von Oech, 2022, p.71)

EXPLORATION

Can be thought of as using a map to drive to unexplored regions. You're limited by the framework of the road system and but can end up in places you (or even very few people) have never been. Explorational creativity is about finding possibilities, 'coulds' and 'cans'.

- Goalless Exploration: Follow your curiosity and see where it leads
- Let each idea suggest where you go next
- Trial & Error
- Experimentation

NOTES

- Build upon and innovate from existing knowledge, "what's old about new ideas is at least as important as what's new about them." (Ward & Kolomyts, 2019, p.175)

EXAMPLES

- *Cryptograms* - Arezzo, French Musical Cryptogram, etc.
- *Schillinger* - interference patterns
- *Musical Dice Games*
- *Art Song*
- *Rules, Tactics, Strategies* - Cope

CONVENTION

Adopt a path, system, or process that others have already used to move from your current reality and closer to your vision. This can involve 'borrowing' concepts and elements from artists who inspired you (seeded exemplars would be a good place to start) and integrating them into your idea generation. You can also utilise processes or systems inspired by other artists' approaches.

- Steal & Borrow
- Processes & Systems
- Experimentation

NOTES

- *Structural Tension* - Develop an original path between current reality and your vision (Fritz, 1991, p.31)

EXAMPLES

Experimentation: A vital component of all of the steps in this stage of the creative process. Trying out your ideas early causes you to move from theoretical speculation about what might work to a real experience of what does and does not work ... Speculation about process is limited in its effectiveness. When you have an idea about how to move from where you are to where you want to be, experiment with the it, try it out. You'll begin to learn about the idea directly and become more practical. You'll begin to invent ways to create the results they want-faster, better, and more efficiently (Fritz, 1991, p.31)

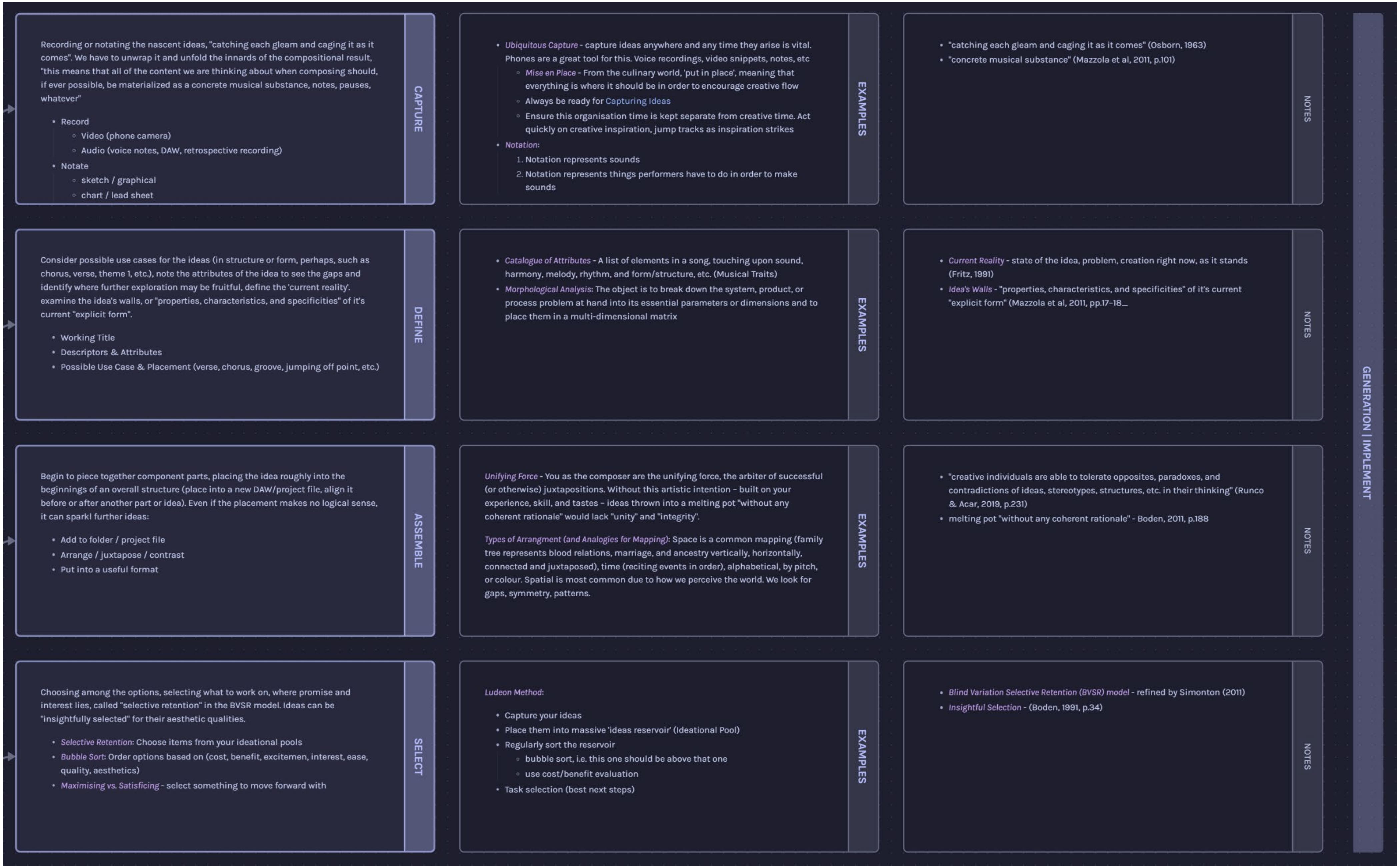
Trial and Error: Don't be afraid to make mistakes or generate bad ideas. Evaluate later.

INVENTION

Develop an original path between current reality and your vision. This involves coming up with ideas using random elements from your raw materials or ingredients list, using the processes or systems or limitations and restrictions you defined in the preparation stage to generate ideas. As with many of these open mode steps, a focus on quantity first, quality second can help increase the likelihood of stumbling upon a useful idea

- Random
- Process
- Improvise
- Experimentation

Fig. 6 - Generation | Ideate (Invention, Convention, Exploration, Connection)



GENERATION | IMPLEMENT

CAPTURE

Recording or notating the nascent ideas, "catching each gleam and caging it as it comes". We have to unwrap it and unfold the innards of the compositional result, "this means that all of the content we are thinking about when composing should, if ever possible, be materialized as a concrete musical substance, notes, pauses, whatever"

- Record
    - Video (phone camera)
    - Audio (voice notes, DAW, retrospective recording)
- Notate
    - sketch / graphical
    - chart / lead sheet

EXAMPLES

- *Ubiquitous Capture* - capture ideas anywhere and any time they arise is vital. Phones are a great tool for this. Voice recordings, video snippets, notes, etc
    - *Mise en Place* - From the culinary world, 'put in place', meaning that everything is where it should be in order to encourage creative flow
    - Always be ready for Capturing Ideas
    - Ensure this organisation time is kept separate from creative time. Act quickly on creative inspiration, jump tracks as inspiration strikes
- *Notation:*
    1. Notation represents sounds
    2. Notation represents things performers have to do in order to make sounds

NOTES

- "catching each gleam and caging it as it comes" (Osborn, 1963)
- "concrete musical substance" (Mazzola et al, 2011, p.101)

DEFINE

Consider possible use cases for the ideas (in structure or form, perhaps, such as chorus, verse, theme 1, etc.), note the attributes of the idea to see the gaps and identify where further exploration may be fruitful, define the 'current reality'. examine the idea's walls, or "properties, characteristics, and specificities" of it's current "explicit form".

- Working Title
- Descriptors & Attributes
- Possible Use Case & Placement (verse, chorus, groove, jumping off point, etc.)

EXAMPLES

- *Catalogue of Attributes* - A list of elements in a song, touching upon sound, harmony, melody, rhythm, and form/structure, etc. (Musical Traits)
- *Morphological Analysis*: The object is to break down the system, product, or process problem at hand into its essential parameters or dimensions and to place them in a multi-dimensional matrix

NOTES

- *Current Reality* - state of the idea, problem, creation right now, as it stands (Fritz, 1991)
- *Idea's Walls* - "properties, characteristics, and specificities" of it's current "explicit form" (Mazzola et al, 2011, pp.17–18_

ASSEMBLE

Begin to piece together component parts, placing the idea roughly into the beginnings of an overall structure (place into a new DAW/project file, align it before or after another part or idea). Even if the placement makes no logical sense, it can sparkl further ideas:

- Add to folder / project file
- Arrange / juxtapose / contrast
- Put into a useful format

EXAMPLES

Unifying Force - You as the composer are the unifying force, the arbiter of successful (or otherwise) juxtapositions. Without this artistic intention – built on your experience, skill, and tastes – ideas thrown into a melting pot "without any coherent rationale" would lack "unity" and "integrity".

Types of Arrangment (and Analogies for Mapping): Space is a common mapping (family tree represents blood relations, marriage, and ancestry vertically, horizontally, connected and juxtaposed), time (reciting events in order), alphabetical, by pitch, or colour. Spatial is most common due to how we perceive the world. We look for gaps, symmetry, patterns.

NOTES

- "creative individuals are able to tolerate opposites, paradoxes, and contradictions of ideas, stereotypes, structures, etc. in their thinking" (Runco & Acar, 2019, p.231)
- melting pot "without any coherent rationale" - Boden, 2011, p.188

SELECT

Choosing among the options, selecting what to work on, where promise and interest lies, called "selective retention" in the BVSR model. Ideas can be "insightfully selected" for their aesthetic qualities.

- *Selective Retention*: Choose items from your ideational pools
- *Bubble Sort*: Order options based on (cost, benefit, excitemen, interest, ease, quality, aesthetics)
- *Maximising vs. Satisficing* - select something to move forward with

EXAMPLES

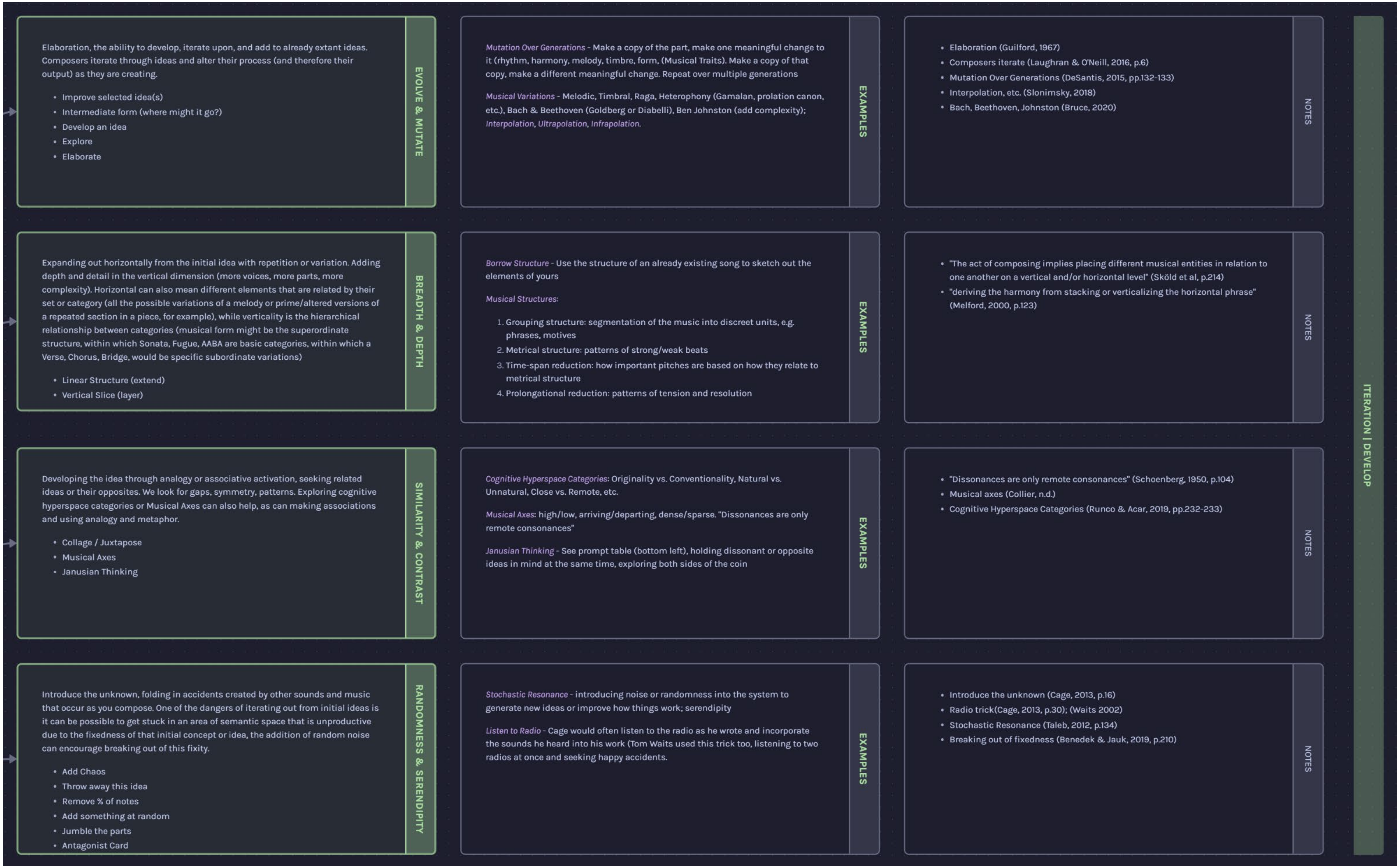
Ludeon Method:

- Capture your ideas
- Place them into massive 'ideas reservoir' (Ideational Pool)
- Regularly sort the reservoir
    - bubble sort, i.e. this one should be above that one
    - use cost/benefit evaluation
- Task selection (best next steps)

NOTES

- *Blind Variation Selective Retention (BVSR) model* - refined by Simonton (2011)
- *Insightful Selection* - (Boden, 1991, p.34)

Fig. 7 – Generation | Implement (Capture, Define, Assemble, Select)



ITERATION | DEVELOP

EVOLVE & MUTATE

Elaboration, the ability to develop, iterate upon, and add to already extant ideas. Composers iterate through ideas and alter their process (and therefore their output) as they are creating.

- Improve selected idea(s)
- Intermediate form (where might it go?)
- Develop an idea
- Explore
- Elaborate

EXAMPLES

Mutation Over Generations - Make a copy of the part, make one meaningful change to it (rhythm, harmony, melody, timbre, form, (Musical Traits). Make a copy of that copy, make a different meaningful change. Repeat over multiple generations

Musical Variations - Melodic, Timbral, Raga, Heterophony (Gamalan, prolation canon, etc.), Bach & Beethoven (Goldberg or Diabelli), Ben Johnston (add complexity); *Interpolation*, *Ultrapolation*, *Infrapolation*.

NOTES

- Elaboration (Guilford, 1967)
- Composers iterate (Laughran & O'Neill, 2016, p.6)
- Mutation Over Generations (DeSantis, 2015, pp.132-133)
- Interpolation, etc. (Slonimsky, 2018)
- Bach, Beethoven, Johnston (Bruce, 2020)

BREADTH & DEPTH

Expanding out horizontally from the initial idea with repetition or variation. Adding depth and detail in the vertical dimension (more voices, more parts, more complexity). Horizontal can also mean different elements that are related by their set or category (all the possible variations of a melody or prime/altered versions of a repeated section in a piece, for example), while verticality is the hierarchical relationship between categories (musical form might be the superordinate structure, within which Sonata, Fugue, AABA are basic categories, within which a Verse, Chorus, Bridge, would be specific subordinate variations)

- Linear Structure (extend)
- Vertical Slice (layer)

EXAMPLES

Borrow Structure - Use the structure of an already existing song to sketch out the elements of yours

Musical Structures:

1. Grouping structure: segmentation of the music into discreet units, e.g. phrases, motives
2. Metrical structure: patterns of strong/weak beats
3. Time-span reduction: how important pitches are based on how they relate to metrical structure
4. Prolongational reduction: patterns of tension and resolution

NOTES

- "The act of composing implies placing different musical entities in relation to one another on a vertical and/or horizontal level" (Sköld et al, p.214)
- "deriving the harmony from stacking or verticalizing the horizontal phrase" (Melford, 2000, p.123)

SIMILARITY & CONTRAST

Developing the idea through analogy or associative activation, seeking related ideas or their opposites. We look for gaps, symmetry, patterns. Exploring cognitive hyperspace categories or Musical Axes can also help, as can making associations and using analogy and metaphor.

- Collage / Juxtapose
- Musical Axes
- Janusian Thinking

EXAMPLES

Cognitive Hyperspace Categories: Originality vs. Conventionality, Natural vs. Unnatural, Close vs. Remote, etc.

Musical Axes: high/low, arriving/departing, dense/sparse. "Dissonances are only remote consonances"

Janusian Thinking - See prompt table (bottom left), holding dissonant or opposite ideas in mind at the same time, exploring both sides of the coin

NOTES

- "Dissonances are only remote consonances" (Schoenberg, 1950, p.104)
- Musical axes (Collier, n.d.)
- Cognitive Hyperspace Categories (Runco & Acar, 2019, pp.232-233)

RANDOMNESS & SERENDIPITY

Introduce the unknown, folding in accidents created by other sounds and music that occur as you compose. One of the dangers of iterating out from initial ideas is it can be possible to get stuck in an area of semantic space that is unproductive due to the fixedness of that initial concept or idea, the addition of random noise can encourage breaking out of this fixity.

- Add Chaos
- Throw away this idea
- Remove % of notes
- Add something at random
- Jumble the parts
- Antagonist Card

EXAMPLES

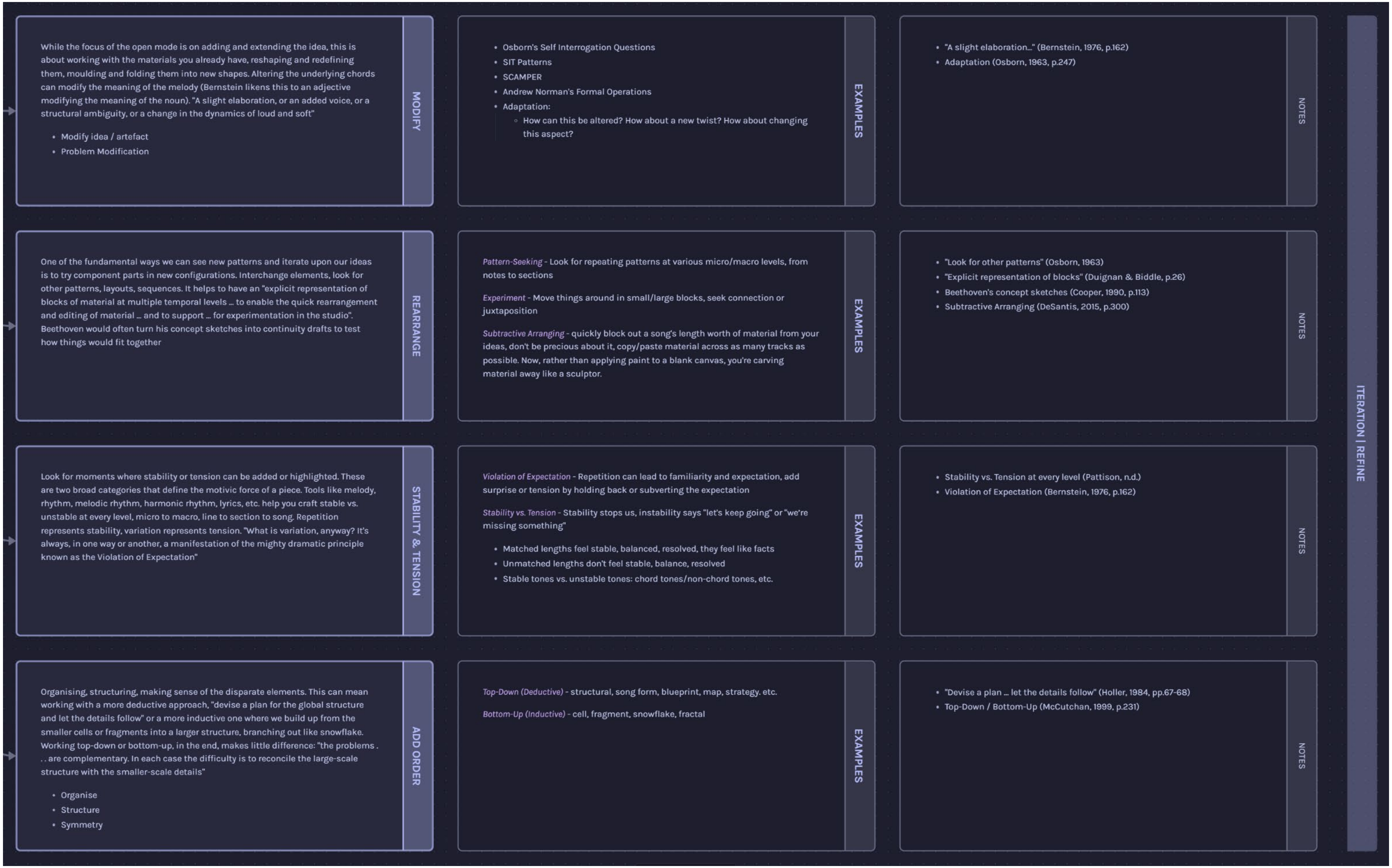
Stochastic Resonance - introducing noise or randomness into the system to generate new ideas or improve how things work; serendipity

Listen to Radio - Cage would often listen to the radio as he wrote and incorporate the sounds he heard into his work (Tom Waits used this trick too, listening to two radios at once and seeking happy accidents.

NOTES

- Introduce the unknown (Cage, 2013, p.16)
- Radio trick(Cage, 2013, p.30); (Waits 2002)
- Stochastic Resonance (Taleb, 2012, p.134)
- Breaking out of fixedness (Benedek & Jauk, 2019, p.210)

Fig. 8 - Iteration | Develop (Randomness & Serendipity, Similarity & Contrast, Breadth & Depth, Evolve & Mutate)



ITERATION | REFINE

MODIFY

While the focus of the open mode is on adding and extending the idea, this is about working with the materials you already have, reshaping and redefining them, moulding and folding them into new shapes. Altering the underlying chords can modify the meaning of the melody (Bernstein likens this to an adjective modifying the meaning of the noun). "A slight elaboration, or an added voice, or a structural ambiguity, or a change in the dynamics of loud and soft"

- Modify idea / artefact
- Problem Modification

EXAMPLES

- Osborn's Self Interrogation Questions
- SIT Patterns
- SCAMPER
- Andrew Norman's Formal Operations
- Adaptation:
    - How can this be altered? How about a new twist? How about changing this aspect?

NOTES

- "A slight elaboration..." (Bernstein, 1976, p.162)
- Adaptation (Osborn, 1963, p.247)

REARRANGE

One of the fundamental ways we can see new patterns and iterate upon our ideas is to try component parts in new configurations. Interchange elements, look for other patterns, layouts, sequences. It helps to have an "explicit representation of blocks of material at multiple temporal levels ... to enable the quick rearrangement and editing of material ... and to support ... for experimentation in the studio". Beethoven would often turn his concept sketches into continuity drafts to test how things would fit together

EXAMPLES

Pattern-Seeking - Look for repeating patterns at various micro/macro levels, from notes to sections

Experiment - Move things around in small/large blocks, seek connection or juxtaposition

Subtractive Arranging - quickly block out a song's length worth of material from your ideas, don't be precious about it, copy/paste material across as many tracks as possible. Now, rather than applying paint to a blank canvas, you're carving material away like a sculptor.

NOTES

- "Look for other patterns" (Osborn, 1963)
- "Explicit representation of blocks" (Duignan & Biddle, p.26)
- Beethoven's concept sketches (Cooper, 1990, p.113)
- Subtractive Arranging (DeSantis, 2015, p.300)

STABILITY & TENSION

Look for moments where stability or tension can be added or highlighted. These are two broad categories that define the motivic force of a piece. Tools like melody, rhythm, melodic rhythm, harmonic rhythm, lyrics, etc. help you craft stable vs. unstable at every level, micro to macro, line to section to song. Repetition represents stability, variation represents tension. "What is variation, anyway? It's always, in one way or another, a manifestation of the mighty dramatic principle known as the Violation of Expectation"

EXAMPLES

Violation of Expectation - Repetition can lead to familiarity and expectation, add surprise or tension by holding back or subverting the expectation

Stability vs. Tension - Stability stops us, instability says "let's keep going" or "we're missing something"

- Matched lengths feel stable, balanced, resolved, they feel like facts
- Unmatched lengths don't feel stable, balance, resolved
- Stable tones vs. unstable tones: chord tones/non-chord tones, etc.

NOTES

- Stability vs. Tension at every level (Pattison, n.d.)
- Violation of Expectation (Bernstein, 1976, p.162)

ADD ORDER

Organising, structuring, making sense of the disparate elements. This can mean working with a more deductive approach, "devise a plan for the global structure and let the details follow" or a more inductive one where we build up from the smaller cells or fragments into a larger structure, branching out like snowflake. Working top-down or bottom-up, in the end, makes little difference: "the problems . . . are complementary. In each case the difficulty is to reconcile the large-scale structure with the smaller-scale details"

- Organise
- Structure
- Symmetry

EXAMPLES

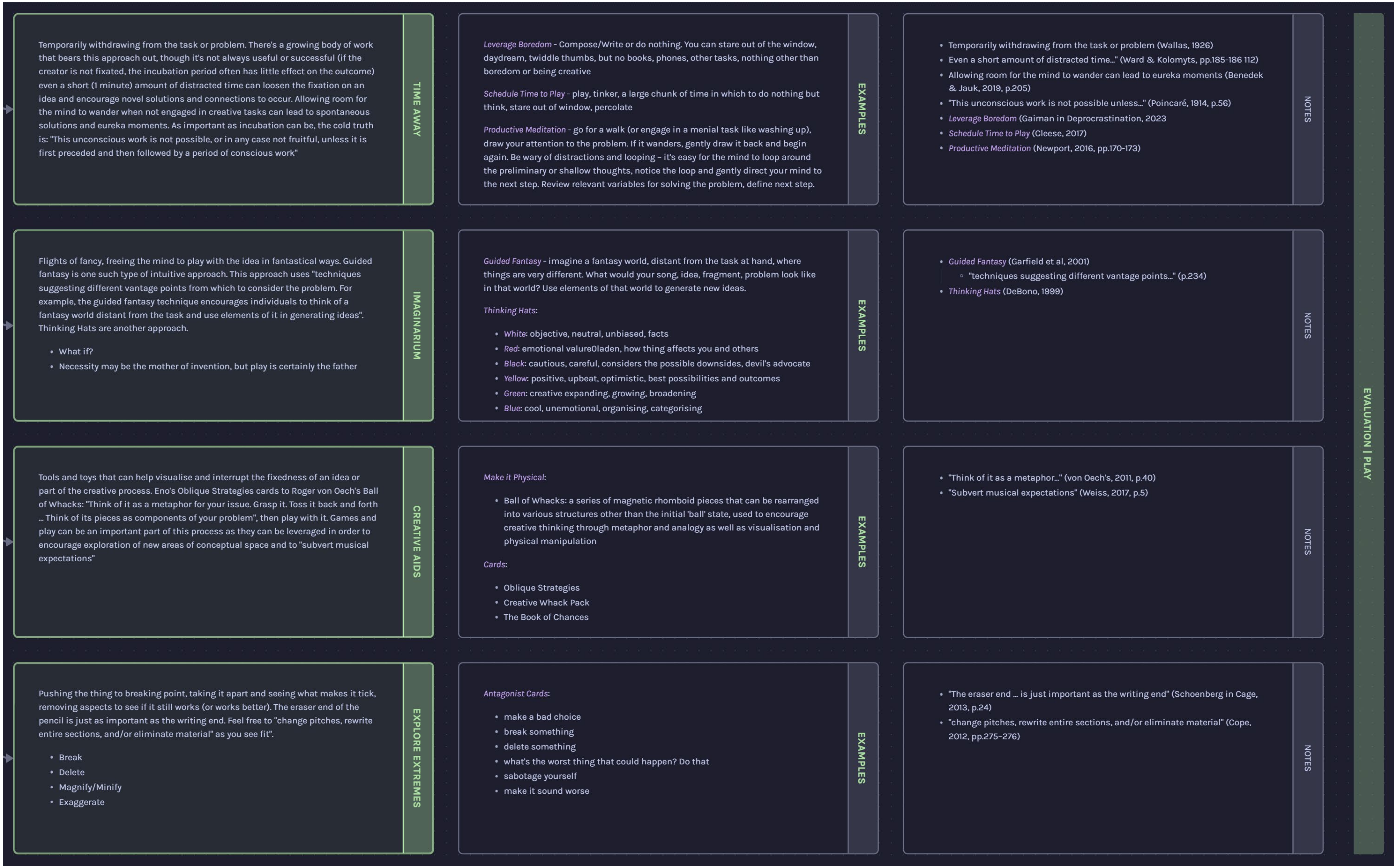
Top-Down (Deductive) - structural, song form, blueprint, map, strategy. etc.

Bottom-Up (Inductive) - cell, fragment, snowflake, fractal

NOTES

- "Devise a plan ... let the details follow" (Holler, 1984, pp.67-68)
- Top-Down / Bottom-Up (McCutchan, 1999, p.231)

Fig. 9 - Iteration | Refine (Modify, Rearrange, Stability & Tension, Add Order)



Temporarily withdrawing from the task or problem. There's a growing body of work that bears this approach out, though it's not always useful or successful (if the creator is not fixated, the incubation period often has little effect on the outcome) even a short (1 minute) amount of distracted time can loosen the fixation on an idea and encourage novel solutions and connections to occur. Allowing room for the mind to wander when not engaged in creative tasks can lead to spontaneous solutions and eureka moments. As important as incubation can be, the cold truth is: "This unconscious work is not possible, or in any case not fruitful, unless it is first preceded and then followed by a period of conscious work"

Leverage Boredom - Compose/Write or do nothing. You can stare out of the window, daydream, twiddle thumbs, but no books, phones, other tasks, nothing other than boredom or being creative

Schedule Time to Play - play, tinker, a large chunk of time in which to do nothing but think, stare out of window, percolate

Productive Meditation - go for a walk (or engage in a menial task like washing up), draw your attention to the problem. If it wanders, gently draw it back and begin again. Be wary of distractions and looping - it's easy for the mind to loop around the preliminary or shallow thoughts, notice the loop and gently direct your mind to the next step. Review relevant variables for solving the problem, define next step.

- Temporarily withdrawing from the task or problem (Wallas, 1926)
- Even a short amount of distracted time..." (Ward & Kolomyts, pp.185-186 112)
- Allowing room for the mind to wander can lead to eureka moments (Benedek & Jauk, 2019, p.205)
- "This unconscious work is not possible unless..." (Poincaré, 1914, p.56)
- *Leverage Boredom* (Gaiman in Deprocrastination, 2023
- *Schedule Time to Play* (Cleese, 2017)
- *Productive Meditation* (Newport, 2016, pp.170-173)

Flights of fancy, freeing the mind to play with the idea in fantastical ways. Guided fantasy is one such type of intuitive approach. This approach uses "techniques suggesting different vantage points from which to consider the problem. For example, the guided fantasy technique encourages individuals to think of a fantasy world distant from the task and use elements of it in generating ideas". Thinking Hats are another approach.

- What if?
- Necessity may be the mother of invention, but play is certainly the father

Guided Fantasy - imagine a fantasy world, distant from the task at hand, where things are very different. What would your song, idea, fragment, problem look like in that world? Use elements of that world to generate new ideas.

Thinking Hats:

- *White*: objective, neutral, unbiased, facts
- *Red*: emotional valure0laden, how thing affects you and others
- *Black*: cautious, careful, considers the possible downsides, devil's advocate
- *Yellow*: positive, upbeat, optimistic, best possibilities and outcomes
- *Green*: creative expanding, growing, broadening
- *Blue*: cool, unemotional, organising, categorising

- *Guided Fantasy* (Garfield et al, 2001)
  - "techniques suggesting different vantage points..." (p.234)
- *Thinking Hats* (DeBono, 1999)

Tools and toys that can help visualise and interrupt the fixedness of an idea or part of the creative process. Eno's Oblique Strategies cards to Roger von Oech's Ball of Whacks: "Think of it as a metaphor for your issue. Grasp it. Toss it back and forth ... Think of its pieces as components of your problem", then play with it. Games and play can be an important part of this process as they can be leveraged in order to encourage exploration of new areas of conceptual space and to "subvert musical expectations"

Make it Physical:

- Ball of Whacks: a series of magnetic rhomboid pieces that can be rearranged into various structures other than the initial 'ball' state, used to encourage creative thinking through metaphor and analogy as well as visualisation and physical manipulation

Cards:

- Oblique Strategies
- Creative Whack Pack
- The Book of Chances

- "Think of it as a metaphor..." (von Oech's, 2011, p.40)
- "Subvert musical expectations" (Weiss, 2017, p.5)

Pushing the thing to breaking point, taking it apart and seeing what makes it tick, removing aspects to see if it still works (or works better). The eraser end of the pencil is just as important as the writing end. Feel free to "change pitches, rewrite entire sections, and/or eliminate material" as you see fit".

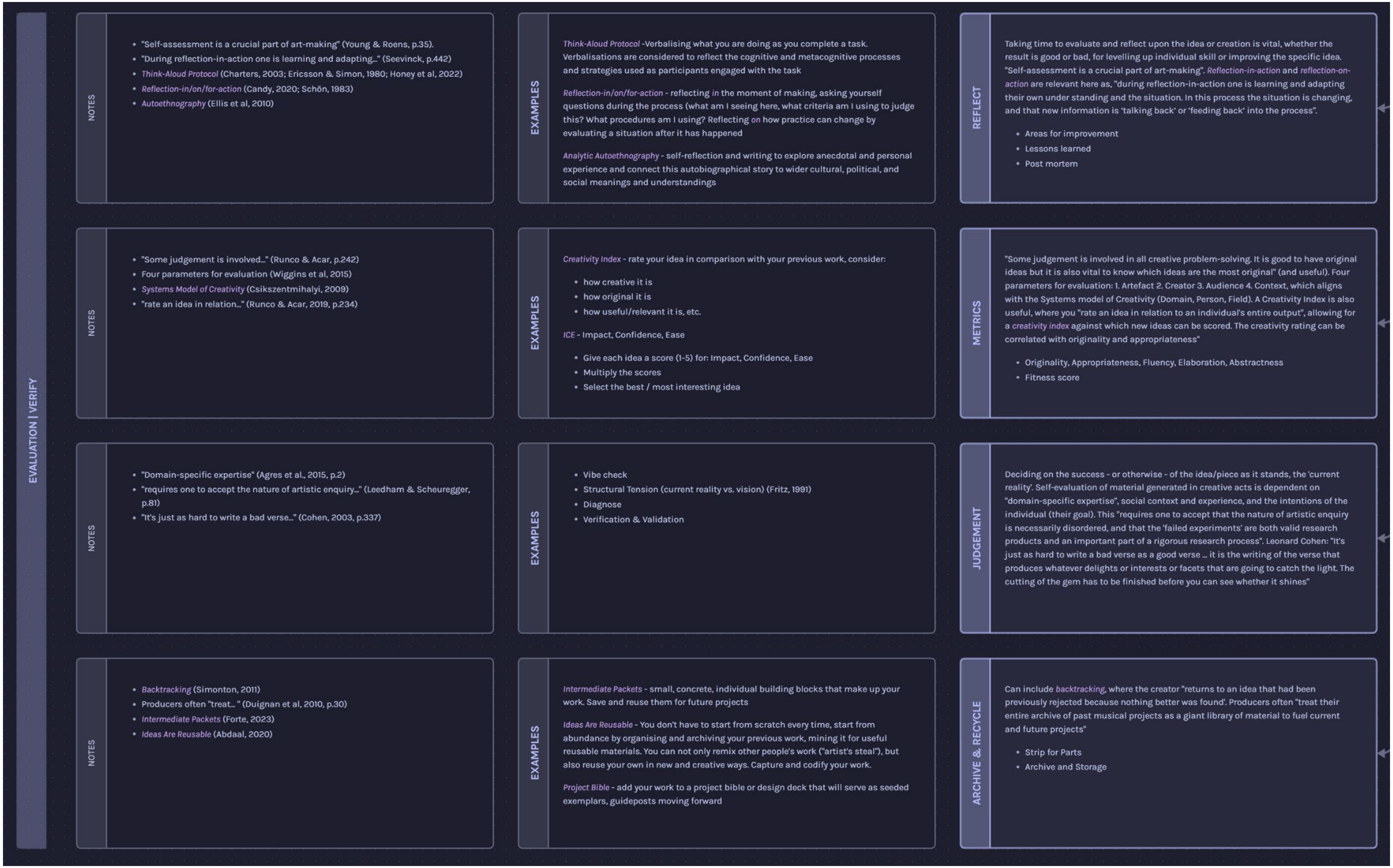
- Break
- Delete
- Magnify/Minify
- Exaggerate

Antagonist Cards:

- make a bad choice
- break something
- delete something
- what's the worst thing that could happen? Do that
- sabotage yourself
- make it sound worse

- "The eraser end ... is just important as the writing end" (Schoenberg in Cage, 2013, p.24)
- "change pitches, rewrite entire sections, and/or eliminate material" (Cope, 2012, pp.275-276)

Fig. 10 - Evaluation | Play (Explore Extremes, Creative Aids, Imaginarium, Time Away)



EVALUATION | VERIFY

NOTES

- "Self-assessment is a crucial part of art-making" (Young & Roens, p.35).
- "During reflection-in-action one is learning and adapting..." (Seevinck, p.442)
- *Think-Aloud Protocol* (Charters, 2003; Ericsson & Simon, 1980; Honey et al, 2022)
- *Reflection-in/on/for-action* (Candy, 2020; Schön, 1983)
- *Autoethnography* (Ellis et al, 2010)

EXAMPLES

Think-Aloud Protocol -Verbalising what you are doing as you complete a task. Verbalisations are considered to reflect the cognitive and metacognitive processes and strategies used as participants engaged with the task

Reflection-in/on/for-action - reflecting *in* the moment of making, asking yourself questions during the process (what am I seeing here, what criteria am I using to judge this? What procedures am I using? Reflecting *on* how practice can change by evaluating a situation after it has happened

Analytic Autoethnography - self-reflection and writing to explore anecdotal and personal experience and connect this autobiographical story to wider cultural, political, and social meanings and understandings

REFLECT

Taking time to evaluate and reflect upon the idea or creation is vital, whether the result is good or bad, for levelling up individual skill or improving the specific idea. "Self-assessment is a crucial part of art-making". *Reflection-in-action* and *reflection-on-action* are relevant here as, "during reflection-in-action one is learning and adapting their own under standing and the situation. In this process the situation is changing, and that new information is 'talking back' or 'feeding back' into the process".

- Areas for improvement
- Lessons learned
- Post mortem

NOTES

- "Some judgement is involved..." (Runco & Acar, p.242)
- Four parameters for evaluation (Wiggins et al, 2015)
- *Systems Model of Creativity* (Csikszentmihalyi, 2009)
- "rate an idea in relation..." (Runco & Acar, 2019, p.234)

EXAMPLES

Creativity Index - rate your idea in comparison with your previous work, consider:

- how creative it is
- how original it is
- how useful/relevant it is, etc.

ICE - Impact, Confidence, Ease

- Give each idea a score (1-5) for: Impact, Confidence, Ease
- Multiply the scores
- Select the best / most interesting idea

METRICS

"Some judgement is involved in all creative problem-solving. It is good to have original ideas but it is also vital to know which ideas are the most original" (and useful). Four parameters for evaluation: 1. Artefact 2. Creator 3. Audience 4. Context, which aligns with the Systems model of Creativity (Domain, Person, Field). A Creativity Index is also useful, where you "rate an idea in relation to an individual's entire output", allowing for a *creativity index* against which new ideas can be scored. The creativity rating can be correlated with originality and appropriateness"

- Originality, Appropriateness, Fluency, Elaboration, Abstractness
- Fitness score

NOTES

- "Domain-specific expertise" (Agres et al., 2015, p.2)
- "requires one to accept the nature of artistic enquiry..." (Leedham & Scheuregger, p.81)
- "It's just as hard to write a bad verse..." (Cohen, 2003, p.337)

EXAMPLES

- Vibe check
- Structural Tension (current reality vs. vision) (Fritz, 1991)
- Diagnose
- Verification & Validation

JUDGEMENT

Deciding on the success - or otherwise - of the idea/piece as it stands, the 'current reality'. Self-evaluation of material generated in creative acts is dependent on "domain-specific expertise", social context and experience, and the intentions of the individual (their goal). This "requires one to accept that the nature of artistic enquiry is necessarily disordered, and that the 'failed experiments' are both valid research products and an important part of a rigorous research process". Leonard Cohen: "It's just as hard to write a bad verse as a good verse ... it is the writing of the verse that produces whatever delights or interests or facets that are going to catch the light. The cutting of the gem has to be finished before you can see whether it shines"

NOTES

- *Backtracking* (Simonton, 2011)
- Producers often "treat... " (Duignan et al, 2010, p.30)
- *Intermediate Packets* (Forte, 2023)
- *Ideas Are Reusable* (Abdaal, 2020)

EXAMPLES

Intermediate Packets - small, concrete, individual building blocks that make up your work. Save and reuse them for future projects

Ideas Are Reusable - You don't have to start from scratch every time, start from abundance by organising and archiving your previous work, mining it for useful reusable materials. You can not only remix other people's work ("artist's steal"), but also reuse your own in new and creative ways. Capture and codify your work.

Project Bible - add your work to a project bible or design deck that will serve as seeded exemplars, guideposts moving forward

ARCHIVE & RECYCLE

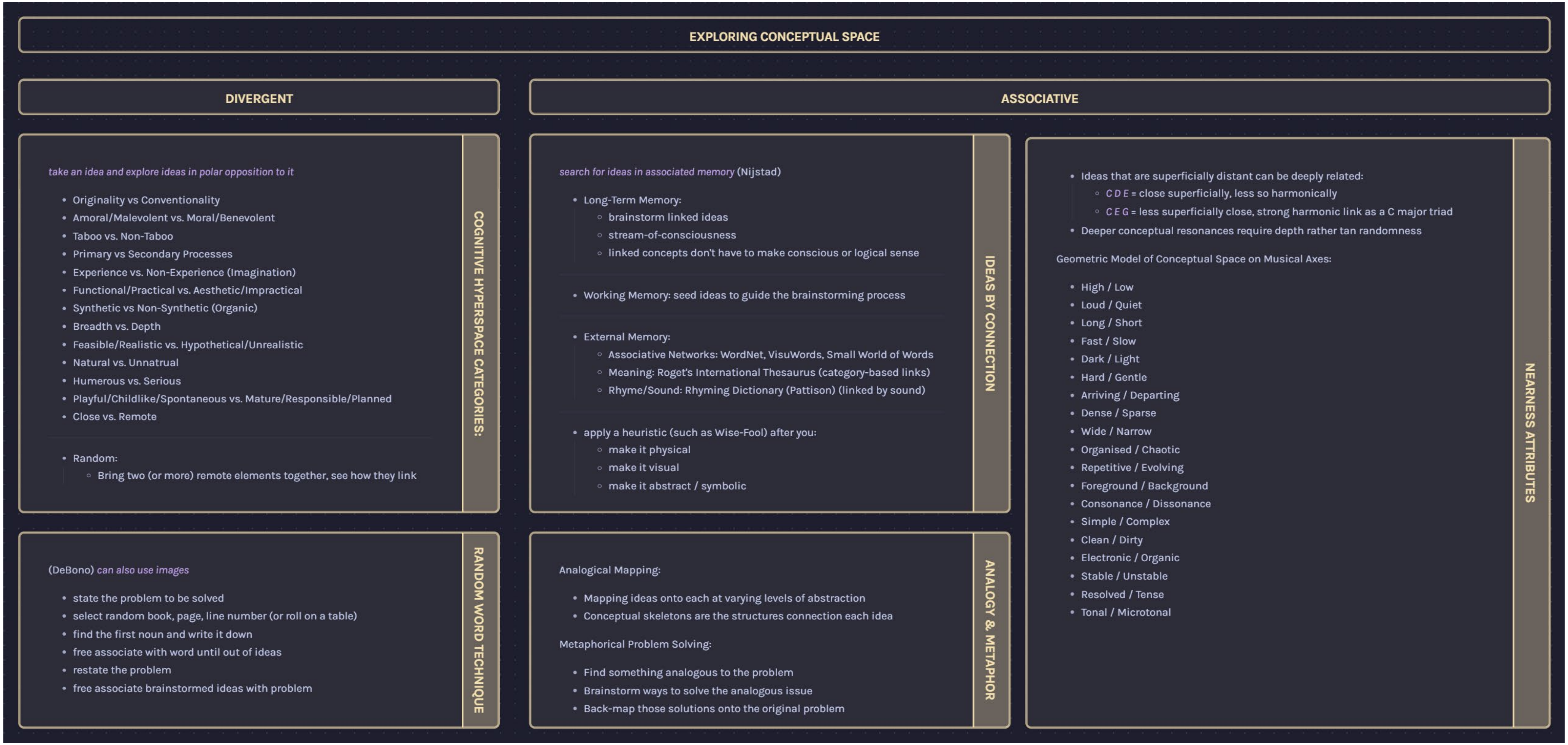
Can include *backtracking*, where the creator "returns to an idea that had been previously rejected because nothing better was found'. Producers often "treat their entire archive of past musical projects as a giant library of material to fuel current and future projects"

- Strip for Parts
- Archive and Storage

Fig. 11 - Evaluation | Verify (Reflect, Metrics, Judgement, Archive & Recycle)

The following figures cover the prompt tables and lists of raw materials that a composer/producer can draw from when seeking to add randomness and serendipity to their creative process (see 'Stochastic Resonance' section of main commentary for further details). These include other models of the creative process drawn from the literature (fig.15), process guides for exploring conceptual space (fig.14), musical ingredients lists (from Cantometrics to Hornbostel–Sachs' classification of musical instruments to musical variations) (fig.16), as well as a list of heuristics, checklists, and interrupters for breaking out of writer's block or to loosen the fixedness of an idea.

Prompts can be used in any way the composer sees fit, from adding limitations to their working process, to suggesting raw materials, to triggering associations and seeding other ideas. Nearness Attributes (fig.12) are a good example of this as ideas conceptually close to the prompt (for example, 'high' or 'loud' or 'long') can also activate concepts that are diametrically opposed ('low', 'quiet', 'short') but conceptually related.



EXPLORING CONCEPTUAL SPACE

DIVERGENT

COGNITIVE HYPERSPACE CATEGORIES:

take an idea and explore ideas in polar opposition to it

- Originality vs Conventionality
- Amoral/Malevolent vs. Moral/Benevolent
- Taboo vs. Non-Taboo
- Primary vs Secondary Processes
- Experience vs. Non-Experience (Imagination)
- Functional/Practical vs. Aesthetic/Impractical
- Synthetic vs Non-Synthetic (Organic)
- Breadth vs. Depth
- Feasible/Realistic vs. Hypothetical/Unrealistic
- Natural vs. Unnatrual
- Humerous vs. Serious
- Playful/Childlike/Spontaneous vs. Mature/Responsible/Planned
- Close vs. Remote

- Random:
  - Bring two (or more) remote elements together, see how they link

RANDOM WORD TECHNIQUE

(DeBono) *can also use images*

- state the problem to be solved
- select random book, page, line number (or roll on a table)
- find the first noun and write it down
- free associate with word until out of ideas
- restate the problem
- free associate brainstormed ideas with problem

ASSOCIATIVE

IDEAS BY CONNECTION

search for ideas in associated memory (Nijstad)

- Long-Term Memory:
  - brainstorm linked ideas
  - stream-of-consciousness
  - linked concepts don't have to make conscious or logical sense

- Working Memory: seed ideas to guide the brainstorming process

- External Memory:
  - Associative Networks: WordNet, VisuWords, Small World of Words
  - Meaning: Roget's International Thesaurus (category-based links)
  - Rhyme/Sound: Rhyming Dictionary (Pattison) (linked by sound)

- apply a heuristic (such as Wise-Fool) after you:
  - make it physical
  - make it visual
  - make it abstract / symbolic

ANALOGY & METAPHOR

Analogical Mapping:

- Mapping ideas onto each at varying levels of abstraction
- Conceptual skeletons are the structures connection each idea

Metaphorical Problem Solving:

- Find something analogous to the problem
- Brainstorm ways to solve the analogous issue
- Back-map those solutions onto the original problem

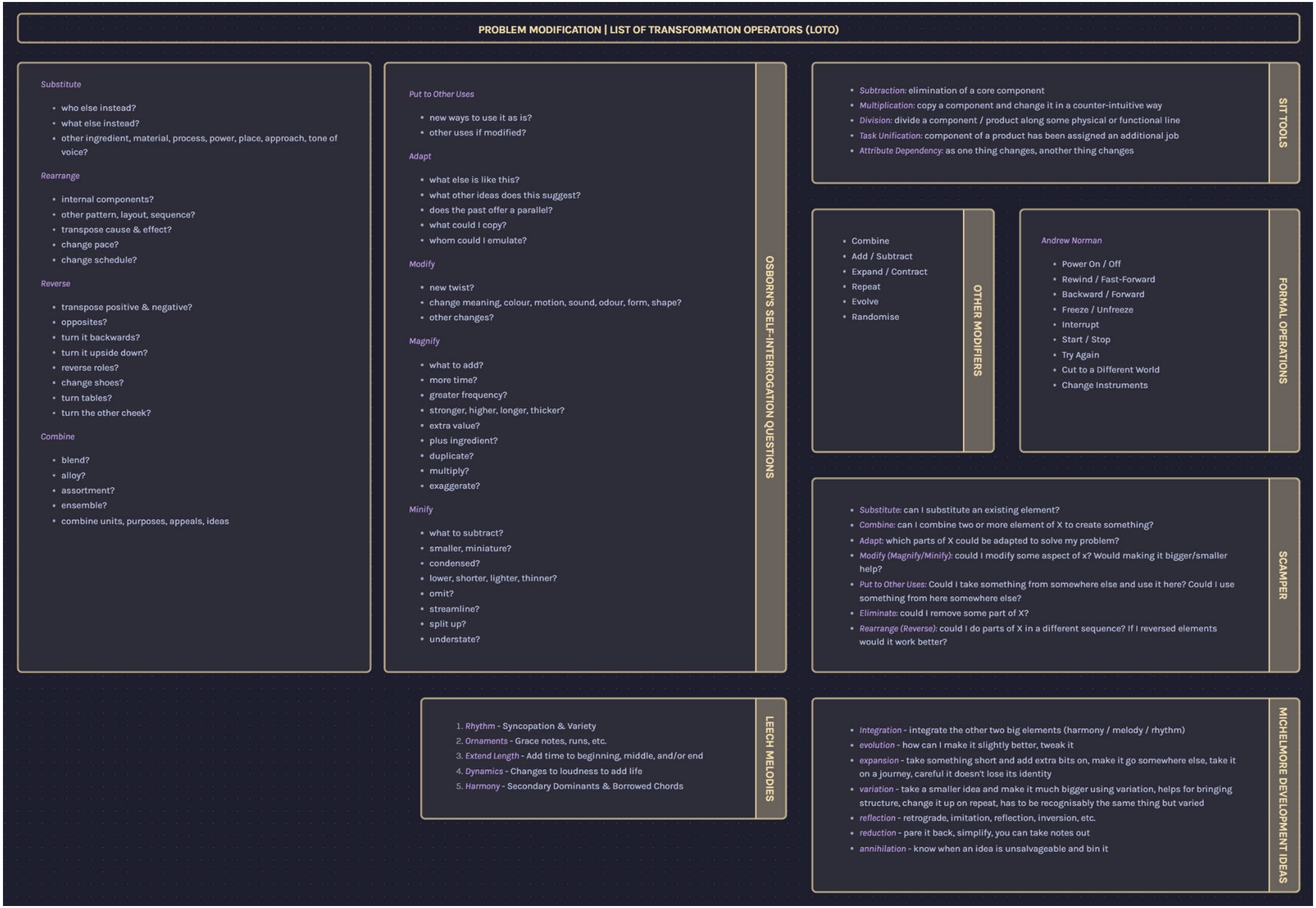
NEARNESS ATTRIBUTES

- Ideas that are superficially distant can be deeply related:
  - *C D E* = close superficially, less so harmonically
  - *C E G* = less superficially close, strong harmonic link as a C major triad
- Deeper conceptual resonances require depth rather tan randomness

Geometric Model of Conceptual Space on Musical Axes:

- High / Low
- Loud / Quiet
- Long / Short
- Fast / Slow
- Dark / Light
- Hard / Gentle
- Arriving / Departing
- Dense / Sparse
- Wide / Narrow
- Organised / Chaotic
- Repetitive / Evolving
- Foreground / Background
- Consonance / Dissonance
- Simple / Complex
- Clean / Dirty
- Electronic / Organic
- Stable / Unstable
- Resolved / Tense
- Tonal / Microtonal

Fig. 12 - Exploring Conceptual Space (including Cognitive Hyperspace Categories and Nearness Attributes)



PROBLEM MODIFICATION | LIST OF TRANSFORMATION OPERATORS (LOTO)

OSBORN'S SELF-INTERROGATION QUESTIONS

Substitute

- who else instead?
- what else instead?
- other ingredient, material, process, power, place, approach, tone of voice?

Rearrange

- internal components?
- other pattern, layout, sequence?
- transpose cause & effect?
- change pace?
- change schedule?

Reverse

- transpose positive & negative?
- opposites?
- turn it backwards?
- turn it upside down?
- reverse roles?
- change shoes?
- turn tables?
- turn the other cheek?

Combine

- blend?
- alloy?
- assortment?
- ensemble?
- combine units, purposes, appeals, ideas

Put to Other Uses

- new ways to use it as is?
- other uses if modified?

Adapt

- what else is like this?
- what other ideas does this suggest?
- does the past offer a parallel?
- what could I copy?
- whom could I emulate?

Modify

- new twist?
- change meaning, colour, motion, sound, odour, form, shape?
- other changes?

Magnify

- what to add?
- more time?
- greater frequency?
- stronger, higher, longer, thicker?
- extra value?
- plus ingredient?
- duplicate?
- multiply?
- exaggerate?

Minify

- what to subtract?
- smaller, miniature?
- condensed?
- lower, shorter, lighter, thinner?
- omit?
- streamline?
- split up?
- understate?

SIT TOOLS

- *Subtraction:* elimination of a core component
- *Multiplication:* copy a component and change it in a counter-intuitive way
- *Division:* divide a component / product along some physical or functional line
- *Task Unification:* component of a product has been assigned an additional job
- *Attribute Dependency:* as one thing changes, another thing changes

OTHER MODIFIERS

- Combine
- Add / Subtract
- Expand / Contract
- Repeat
- Evolve
- Randomise

FORMAL OPERATIONS

Andrew Norman

- Power On / Off
- Rewind / Fast-Forward
- Backward / Forward
- Freeze / Unfreeze
- Interrupt
- Start / Stop
- Try Again
- Cut to a Different World
- Change Instruments

SCAMPER

- *Substitute:* can I substitute an existing element?
- *Combine:* can I combine two or more element of X to create something?
- *Adapt:* which parts of X could be adapted to solve my problem?
- *Modify (Magnify/Minify):* could I modify some aspect of x? Would making it bigger/smaller help?
- *Put to Other Uses:* Could I take something from somewhere else and use it here? Could I use something from here somewhere else?
- *Eliminate:* could I remove some part of X?
- *Rearrange (Reverse):* could I do parts of X in a different sequence? If I reversed elements would it work better?

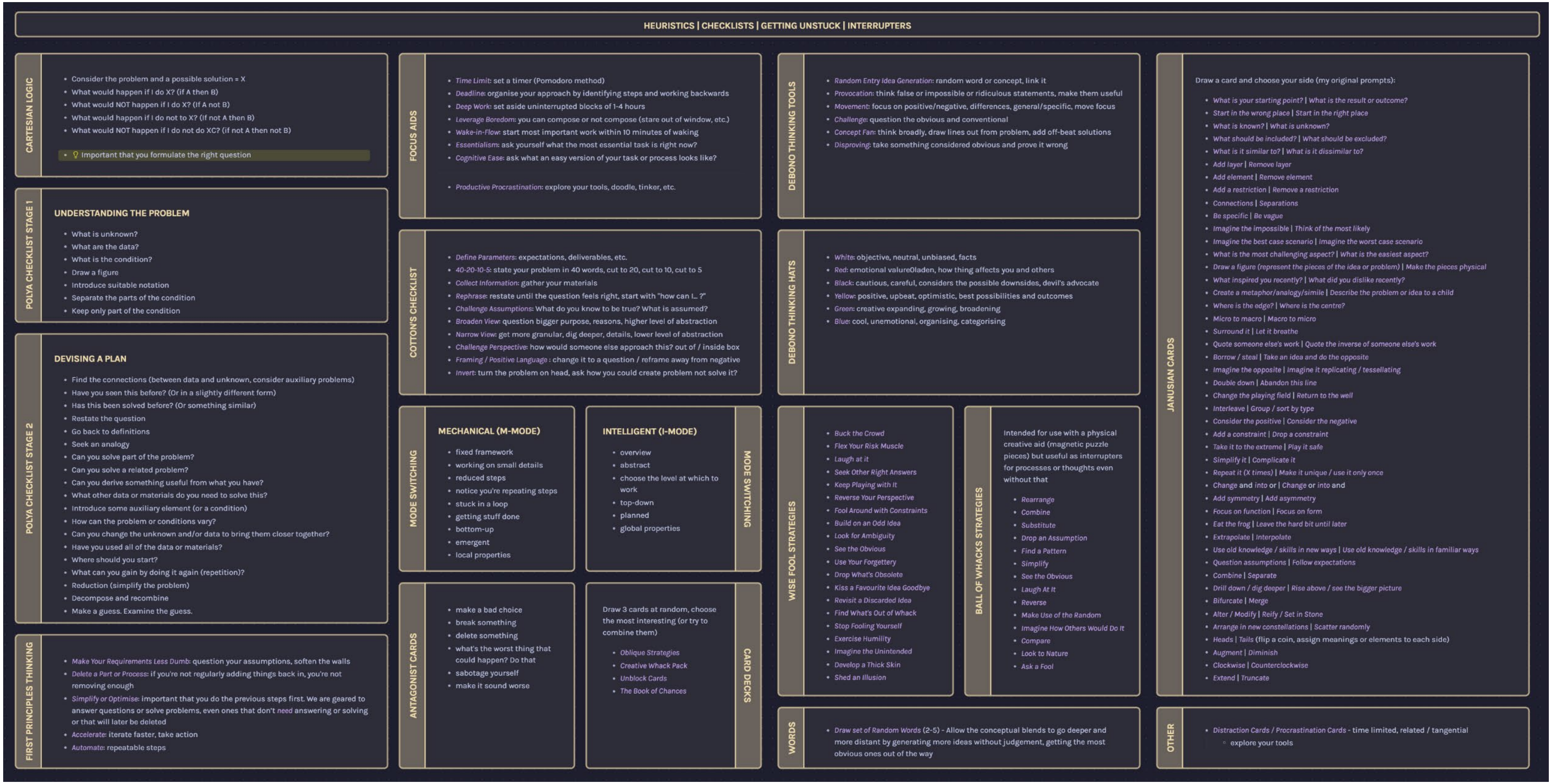
LEECH MELODIES

1. *Rhythm* - Syncopation & Variety
2. *Ornaments* - Grace notes, runs, etc.
3. *Extend Length* - Add time to beginning, middle, and/or end
4. *Dynamics* - Changes to loudness to add life
5. *Harmony* - Secondary Dominants & Borrowed Chords

MICHELMORE DEVELOPMENT IDEAS

- *Integration* - integrate the other two big elements (harmony / melody / rhythm)
- *evolution* - how can I make it slightly better, tweak it
- *expansion* - take something short and add extra bits on, make it go somewhere else, take it on a journey, careful it doesn't lose its identity
- *variation* - take a smaller idea and make it much bigger using variation, helps for bringing structure, change it up on repeat, has to be recognisably the same thing but varied
- *reflection* - retrograde, imitation, reflection, inversion, etc.
- *reduction* - pare it back, simplify, you can take notes out
- *annihilation* - know when an idea is unsalvageable and bin it

Fig. 13 - Problem Modification and Transformation Suggestions



HEURISTICS | CHECKLISTS | GETTING UNSTUCK | INTERRUPTERS

CARTESIAN LOGIC

- Consider the problem and a possible solution = X
- What would happen if I do X? (if A then B)
- What would NOT happen if I do X? (If A not B)
- What would happen if I do not to X? (If not A then B)
- What would NOT happen if I do not do XC? (if not A then not B)

- 💡 Important that you formulate the right question

POLYA CHECKLIST STAGE 1

UNDERSTANDING THE PROBLEM

- What is unknown?
- What are the data?
- What is the condition?
- Draw a figure
- Introduce suitable notation
- Separate the parts of the condition
- Keep only part of the condition

POLYA CHECKLIST STAGE 2

DEVISING A PLAN

- Find the connections (between data and unknown, consider auxiliary problems)
- Have you seen this before? (Or in a slightly different form)
- Has this been solved before? (Or something similar)
- Restate the question
- Go back to definitions
- Seek an analogy
- Can you solve part of the problem?
- Can you solve a related problem?
- Can you derive something useful from what you have?
- What other data or materials do you need to solve this?
- Introduce some auxiliary element (or a condition)
- How can the problem or conditions vary?
- Can you change the unknown and/or data to bring them closer together?
- Have you used all of the data or materials?
- Where should you start?
- What can you gain by doing it again (repetition)?
- Reduction (simplify the problem)
- Decompose and recombine
- Make a guess. Examine the guess.

FIRST PRINCIPLES THINKING

- *Make Your Requirements Less Dumb*: question your assumptions, soften the walls
- *Delete a Part or Process*: if you're not regularly adding things back in, you're not removing enough
- *Simplify or Optimise*: important that you do the previous steps first. We are geared to answer questions or solve problems, even ones that don't *need* answering or solving or that will later be deleted
- *Accelerate*: iterate faster, take action
- *Automate*: repeatable steps

FOCUS AIDS

- *Time Limit*: set a timer (Pomodoro method)
- *Deadline*: organise your approach by identifying steps and working backwards
- *Deep Work*: set aside uninterrupted blocks of 1-4 hours
- *Leverage Boredom*: you can compose or not compose (stare out of window, etc.)
- *Wake-in-Flow*: start most important work within 10 minutes of waking
- *Essentialism*: ask yourself what the most essential task is right now?
- *Cognitive Ease*: ask what an easy version of your task or process looks like?

- *Productive Procrastination*: explore your tools, doodle, tinker, etc.

COTTON'S CHECKLIST

- *Define Parameters*: expectations, deliverables, etc.
- *40-20-10-5*: state your problem in 40 words, cut to 20, cut to 10, cut to 5
- *Collect Information*: gather your materials
- *Rephrase*: restate until the question feels right, start with "how can I... ?"
- *Challenge Assumptions*: What do you know to be true? What is assumed?
- *Broaden View*: question bigger purpose, reasons, higher level of abstraction
- *Narrow View*: get more granular, dig deeper, details, lower level of abstraction
- *Challenge Perspective*: how would someone else approach this? out of / inside box
- *Framing / Positive Language* : change it to a question / reframe away from negative
- *Invert*: turn the problem on head, ask how you could create problem not solve it?

MODE SWITCHING

MECHANICAL (M-MODE)

- fixed framework
- working on small details
- reduced steps
- notice you're repeating steps
- stuck in a loop
- getting stuff done
- bottom-up
- emergent
- local properties

INTELLIGENT (I-MODE)

- overview
- abstract
- choose the level at which to work
- top-down
- planned
- global properties

MODE SWITCHING

ANTAGONIST CARDS

- make a bad choice
- break something
- delete something
- what's the worst thing that could happen? Do that
- sabotage yourself
- make it sound worse

CARD DECKS

Draw 3 cards at random, choose the most interesting (or try to combine them)

- *Oblique Strategies*
- *Creative Whack Pack*
- *Unblock Cards*
- *The Book of Chances*

DEBONO THINKING TOOLS

- *Random Entry Idea Generation*: random word or concept, link it
- *Provocation*: think false or impossible or ridiculous statements, make them useful
- *Movement*: focus on positive/negative, differences, general/specific, move focus
- *Challenge*: question the obvious and conventional
- *Concept Fan*: think broadly, draw lines out from problem, add off-beat solutions
- *Disproving*: take something considered obvious and prove it wrong

DEBONO THINKING HATS

- *White*: objective, neutral, unbiased, facts
- *Red*: emotional valueOladen, how thing affects you and others
- *Black*: cautious, careful, considers the possible downsides, devil's advocate
- *Yellow*: positive, upbeat, optimistic, best possibilities and outcomes
- *Green*: creative expanding, growing, broadening
- *Blue*: cool, unemotional, organising, categorising

WISE FOOL STRATEGIES

- *Buck the Crowd*
- *Flex Your Risk Muscle*
- *Laugh at it*
- *Seek Other Right Answers*
- *Keep Playing with It*
- *Reverse Your Perspective*
- *Fool Around with Constraints*
- *Build on an Odd Idea*
- *Look for Ambiguity*
- *See the Obvious*
- *Use Your Forgettery*
- *Drop What's Obsolete*
- *Kiss a Favourite Idea Goodbye*
- *Revisit a Discarded Idea*
- *Find What's Out of Whack*
- *Stop Fooling Yourself*
- *Exercise Humility*
- *Imagine the Unintended*
- *Develop a Thick Skin*
- *Shed an Illusion*

BALL OF WHACKS STRATEGIES

Intended for use with a physical creative aid (magnetic puzzle pieces) but useful as interrupters for processes or thoughts even without that

- *Rearrange*
- *Combine*
- *Substitute*
- *Drop an Assumption*
- *Find a Pattern*
- *Simplify*
- *See the Obvious*
- *Laugh At It*
- *Reverse*
- *Make Use of the Random*
- *Imagine How Others Would Do It*
- *Compare*
- *Look to Nature*
- *Ask a Fool*

WORDS

- *Draw set of Random Words* (2-5) - Allow the conceptual blends to go deeper and more distant by generating more ideas without judgement, getting the most obvious ones out of the way

JANUSIAN CARDS

Draw a card and choose your side (my original prompts):

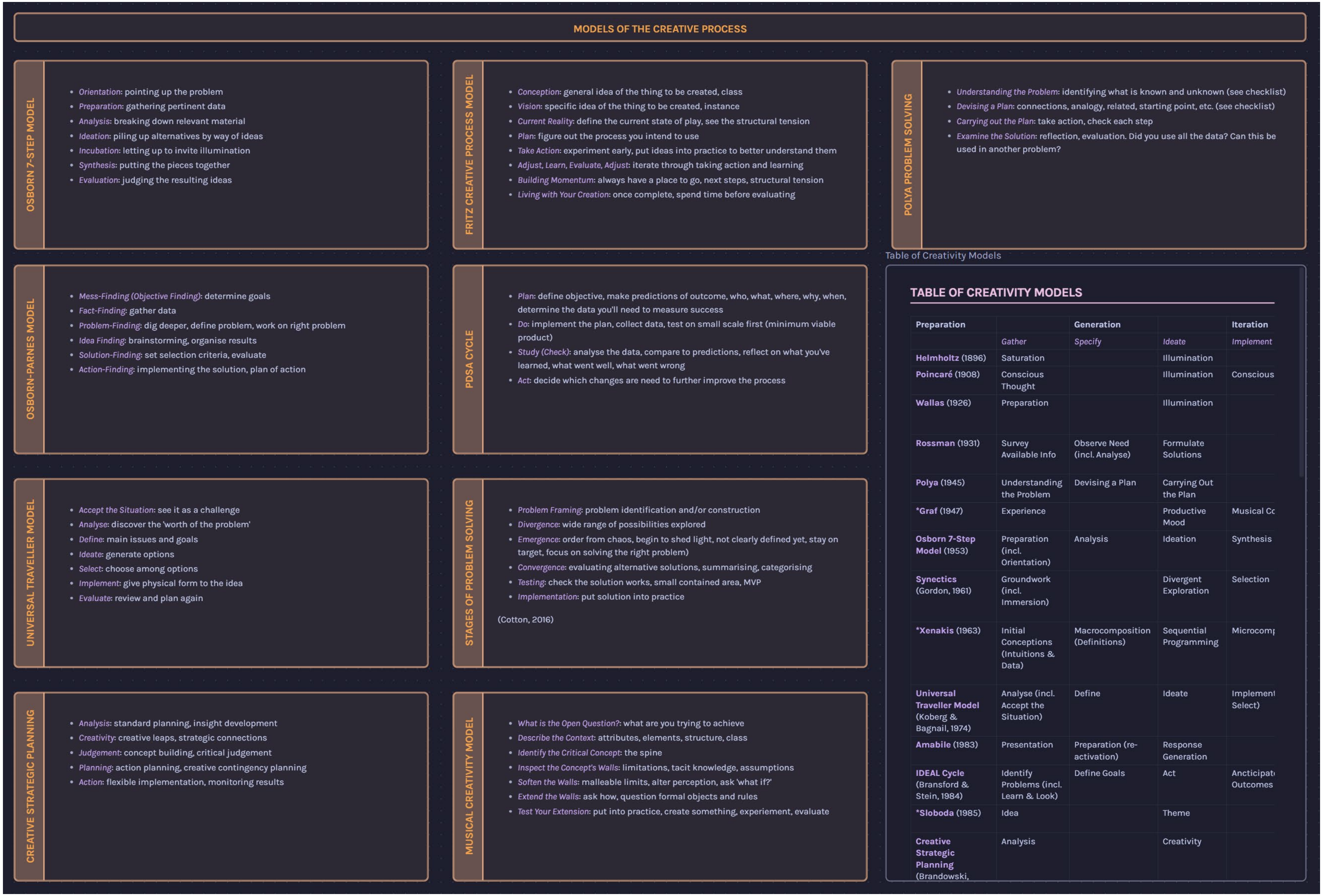
- *What is your starting point? | What is the result or outcome?*
- *Start in the wrong place | Start in the right place*
- *What is known? | What is unknown?*
- *What should be included? | What should be excluded?*
- *What is it similar to? | What is it dissimilar to?*
- *Add layer | Remove layer*
- *Add element | Remove element*
- *Add a restriction | Remove a restriction*
- *Connections | Separations*
- *Be specific | Be vague*
- *Imagine the impossible | Think of the most likely*
- *Imagine the best case scenario | Imagine the worst case scenario*
- *What is the most challenging aspect? | What is the easiest aspect?*
- *Draw a figure (represent the pieces of the idea or problem) | Make the pieces physical*
- *What inspired you recently? | What did you dislike recently?*
- *Create a metaphor/analogy/simile | Describe the problem or idea to a child*
- *Where is the edge? | Where is the centre?*
- *Micro to macro | Macro to micro*
- *Surround it | Let it breathe*
- *Quote someone else's work | Quote the inverse of someone else's work*
- *Borrow / steal | Take an idea and do the opposite*
- *Imagine the opposite | Imagine it replicating / tessellating*
- *Double down | Abandon this line*
- *Change the playing field | Return to the well*
- *Interleave | Group / sort by type*
- *Consider the positive | Consider the negative*
- *Add a constraint | Drop a constraint*
- *Take it to the extreme | Play it safe*
- *Simplify it | Complicate it*
- *Repeat it (X times) | Make it unique / use it only once*
- *Change* and *into* or | *Change* or *into* and
- *Add symmetry | Add asymmetry*
- *Focus on function | Focus on form*
- *Eat the frog | Leave the hard bit until later*
- *Extrapolate | Interpolate*
- *Use old knowledge / skills in new ways | Use old knowledge / skills in familiar ways*
- *Question assumptions | Follow expectations*
- *Combine | Separate*
- *Drill down / dig deeper | Rise above / see the bigger picture*
- *Bifurcate | Merge*
- *Alter / Modify | Reify / Set in Stone*
- *Arrange in new constellations | Scatter randomly*
- *Heads | Tails* (flip a coin, assign meanings or elements to each side)
- *Augment | Diminish*
- *Clockwise | Counterclockwise*
- *Extend | Truncate*

OTHER

- *Distraction Cards / Procrastination Cards* - time limited, related / tangential
    - explore your tools

Fig. 14 - Heuristics, Checklists, Interrupters for Gettig Unstuck (including Polya's Checklist, Cartesian Logic, Janusian Cards, Antagonist Cards)

The **Janusian** and **Antagonist** cards are part of my own contribution to the prompt lists. The **Janusian Cards** offer two sides of a coin for each suggestion or prompt, often opposed or juxtaposed (e.g. ‘Take it to the Extreme | Play it Safe’). The **Antagonist Cards** were one of my favourite inventions as they require a change of perspective and creative persona when using them. This set of prompts offer destructive or out-of-character choices that nudge the composer out of their comfort zone and can often be a great way to break the fixity of an intractable idea or problem.



MODELS OF THE CREATIVE PROCESS

OSBORN 7-STEP MODEL

- *Orientation*: pointing up the problem
- *Preparation*: gathering pertinent data
- *Analysis*: breaking down relevant material
- *Ideation*: piling up alternatives by way of ideas
- *Incubation*: letting up to invite illumination
- *Synthesis*: putting the pieces together
- *Evaluation*: judging the resulting ideas

FRITZ CREATIVE PROCESS MODEL

- *Conception*: general idea of the thing to be created, class
- *Vision*: specific idea of the thing to be created, instance
- *Current Reality*: define the current state of play, see the structural tension
- *Plan*: figure out the process you intend to use
- *Take Action*: experiment early, put ideas into practice to better understand them
- *Adjust, Learn, Evaluate, Adjust*: iterate through taking action and learning
- *Building Momentum*: always have a place to go, next steps, structural tension
- *Living with Your Creation*: once complete, spend time before evaluating

POLYA PROBLEM SOLVING

- *Understanding the Problem*: identifying what is known and unknown (see checklist)
- *Devising a Plan*: connections, analogy, related, starting point, etc. (see checklist)
- *Carrying out the Plan*: take action, check each step
- *Examine the Solution*: reflection, evaluation. Did you use all the data? Can this be used in another problem?

OSBORN-PARNES MODEL

- *Mess-Finding (Objective Finding)*: determine goals
- *Fact-Finding*: gather data
- *Problem-Finding*: dig deeper, define problem, work on right problem
- *Idea Finding*: brainstorming, organise results
- *Solution-Finding*: set selection criteria, evaluate
- *Action-Finding*: implementing the solution, plan of action

PDSA CYCLE

- *Plan*: define objective, make predictions of outcome, who, what, where, why, when, determine the data you'll need to measure success
- *Do*: implement the plan, collect data, test on small scale first (minimum viable product)
- *Study (Check)*: analyse the data, compare to predictions, reflect on what you've learned, what went well, what went wrong
- *Act*: decide which changes are need to further improve the process

UNIVERSAL TRAVELLER MODEL

- *Accept the Situation*: see it as a challenge
- *Analyse*: discover the 'worth of the problem'
- *Define*: main issues and goals
- *Ideate*: generate options
- *Select*: choose among options
- *Implement*: give physical form to the idea
- *Evaluate*: review and plan again

STAGES OF PROBLEM SOLVING

- *Problem Framing*: problem identification and/or construction
- *Divergence*: wide range of possibilities explored
- *Emergence*: order from chaos, begin to shed light, not clearly defined yet, stay on target, focus on solving the right problem)
- *Convergence*: evaluating alternative solutions, summarising, categorising
- *Testing*: check the solution works, small contained area, MVP
- *Implementation*: put solution into practice

(Cotton, 2016)

CREATIVE STRATEGIC PLANNING

- *Analysis*: standard planning, insight development
- *Creativity*: creative leaps, strategic connections
- *Judgement*: concept building, critical judgement
- *Planning*: action planning, creative contingency planning
- *Action*: flexible implementation, monitoring results

MUSICAL CREATIVITY MODEL

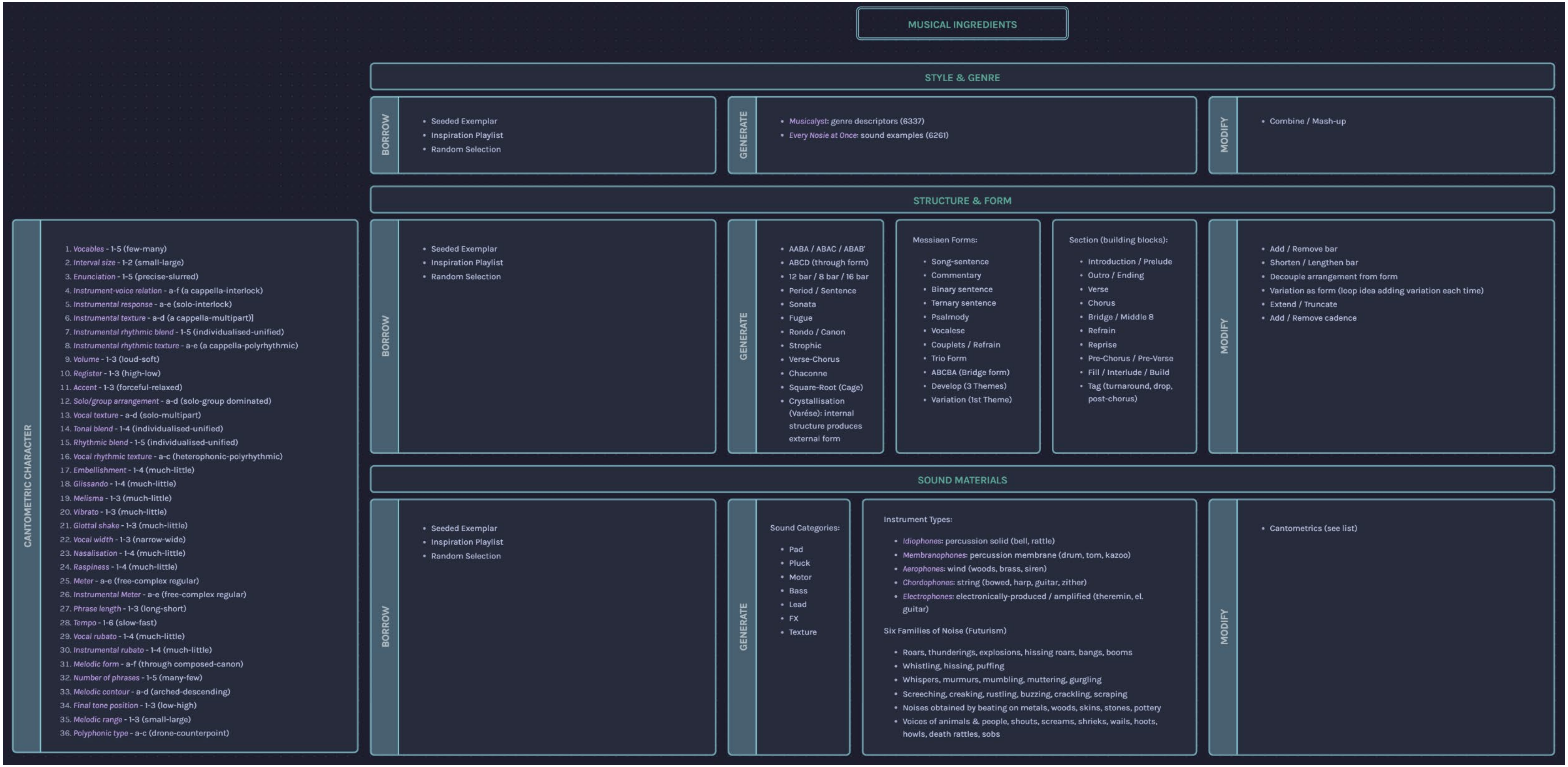
- *What is the Open Question?*: what are you trying to achieve
- *Describe the Context*: attributes, elements, structure, class
- *Identify the Critical Concept*: the spine
- *Inspect the Concept's Walls*: limitations, tacit knowledge, assumptions
- *Soften the Walls*: malleable limits, alter perception, ask 'what if?'
- *Extend the Walls*: ask how, question formal objects and rules
- *Test Your Extension*: put into practice, create something, experiement, evaluate

Table of Creativity Models

TABLE OF CREATIVITY MODELS

Preparation		Generation		Iteration
	Gather	*Specify*	*Ideate*	*Implement*
Helmholtz (1896)	Saturation		Illumination	
Poincaré (1908)	Conscious Thought		Illumination	Conscious
Wallas (1926)	Preparation		Illumination	
Rossman (1931)	Survey Available Info	Observe Need (incl. Analyse)	Formulate Solutions	
Polya (1945)	Understanding the Problem	Devising a Plan	Carrying Out the Plan	
***Graf** (1947)	Experience		Productive Mood	Musical C
Osborn 7-Step Model (1953)	Preparation (incl. Orientation)	Analysis	Ideation	Synthesis
Synectics (Gordon, 1961)	Groundwork (incl. Immersion)		Divergent Exploration	Selection
***Xenakis** (1963)	Initial Conceptions (Intuitions & Data)	Macrocomposition (Definitions)	Sequential Programming	Microcom
Universal Traveller Model (Koberg & Bagnail, 1974)	Analyse (incl. Accept the Situation)	Define	Ideate	Implemen Select)
Amabile (1983)	Presentation	Preparation (re-activation)	Response Generation	
IDEAL Cycle (Bransford & Stein, 1984)	Identify Problems (incl. Learn & Look)	Define Goals	Act	Ancticipat Outcomes
***Sloboda** (1985)	Idea		Theme	
Creative Strategic Planning (Brandowski,	Analysis		Creativity	

Fig. 15 - Models of the Creative Process (steps or process guides for creative exploration)



MUSICAL INGREDIENTS

STYLE & GENRE

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

- *Musicalyst*: genre descriptors (6337)
- *Every Nosie at Once*: sound examples (6261)

MODIFY

- Combine / Mash-up

STRUCTURE & FORM

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

- AABA / ABAC / ABAB'
- ABCD (through form)
- 12 bar / 8 bar / 16 bar
- Period / Sentence
- Sonata
- Fugue
- Rondo / Canon
- Strophic
- Verse-Chorus
- Chaconne
- Square-Root (Cage)
- Crystallisation (Varése): internal structure produces external form

Messiaen Forms:

- Song-sentence
- Commentary
- Binary sentence
- Ternary sentence
- Psalmody
- Vocalese
- Couplets / Refrain
- Trio Form
- ABCBA (Bridge form)
- Develop (3 Themes)
- Variation (1st Theme)

Section (building blocks):

- Introduction / Prelude
- Outro / Ending
- Verse
- Chorus
- Bridge / Middle 8
- Refrain
- Reprise
- Pre-Chorus / Pre-Verse
- Fill / Interlude / Build
- Tag (turnaround, drop, post-chorus)

MODIFY

- Add / Remove bar
- Shorten / Lengthen bar
- Decouple arrangement from form
- Variation as form (loop idea adding variation each time)
- Extend / Truncate
- Add / Remove cadence

SOUND MATERIALS

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

Sound Categories:

- Pad
- Pluck
- Motor
- Bass
- Lead
- FX
- Texture

Instrument Types:

- *Idiophones*: percussion solid (bell, rattle)
- *Membranophones*: percussion membrane (drum, tom, kazoo)
- *Aerophones*: wind (woods, brass, siren)
- *Chordophones*: string (bowed, harp, guitar, zither)
- *Electrophones*: electronically-produced / amplified (theremin, el. guitar)

Six Families of Noise (Futurism)

- Roars, thunderings, explosions, hissing roars, bangs, booms
- Whistling, hissing, puffing
- Whispers, murmurs, mumbling, muttering, gurgling
- Screeching, creaking, rustling, buzzing, crackling, scraping
- Noises obtained by beating on metals, woods, skins, stones, pottery
- Voices of animals & people, shouts, screams, shrieks, wails, hoots, howls, death rattles, sobs

MODIFY

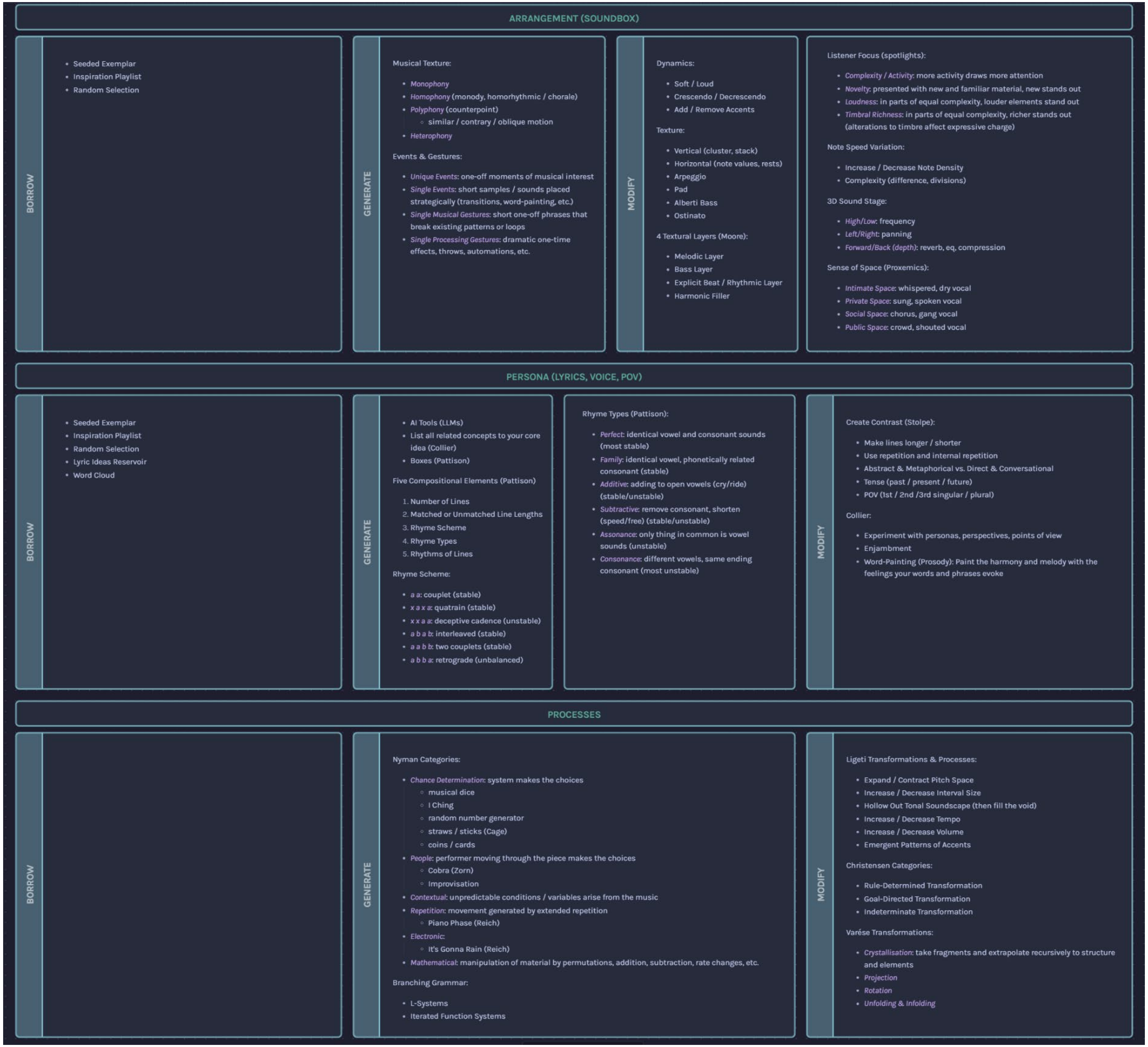
- Cantometrics (see list)

CANTOMETRIC CHARACTER

1. *Vocables* - 1-5 (few-many)
2. *Interval size* - 1-2 (small-large)
3. *Enunciation* - 1-5 (precise-slurred)
4. *Instrument-voice relation* - a-f (a cappella-interlock)
5. *Instrumental response* - a-e (solo-interlock)
6. *Instrumental texture* - a-d (a cappella-multipart)]
7. *Instrumental rhythmic blend* - 1-5 (individualised-unified)
8. *Instrumental rhythmic texture* - a-e (a cappella-polyrhythmic)
9. *Volume* - 1-3 (loud-soft)
10. *Register* - 1-3 (high-low)
11. *Accent* - 1-3 (forceful-relaxed)
12. *Solo/group arrangement* - a-d (solo-group dominated)
13. *Vocal texture* - a-d (solo-multipart)
14. *Tonal blend* - 1-4 (individualised-unified)
15. *Rhythmic blend* - 1-5 (individualised-unified)
16. *Vocal rhythmic texture* - a-c (heterophonic-polyrhythmic)
17. *Embellishment* - 1-4 (much-little)
18. *Glissando* - 1-4 (much-little)
19. *Melisma* - 1-3 (much-little)
20. *Vibrato* - 1-3 (much-little)
21. *Glottal shake* - 1-3 (much-little)
22. *Vocal width* - 1-3 (narrow-wide)
23. *Nasalisation* - 1-4 (much-little)
24. *Raspiness* - 1-4 (much-little)
25. *Meter* - a-e (free-complex regular)
26. *Instrumental Meter* - a-e (free-complex regular)
27. *Phrase length* - 1-3 (long-short)
28. *Tempo* - 1-6 (slow-fast)
29. *Vocal rubato* - 1-4 (much-little)
30. *Instrumental rubato* - 1-4 (much-little)
31. *Melodic form* - a-f (through composed-canon)
32. *Number of phrases* - 1-5 (many-few)
33. *Melodic contour* - a-d (arched-descending)
34. *Final tone position* - 1-3 (low-high)
35. *Melodic range* - 1-3 (small-large)
36. *Polyphonic type* - a-c (drone-counterpoint)

Fig. 16 - Musical Ingredients prompts list (including Style/Genre, Cantometrics, Sound Materials, etc.)

Some of these prompt lists contain a complete catalogue of all the concepts or elements (or, at least, as complete as I could find or generate in the time available, this is an ever-expanding list of possibilities that changed continuously throughout the course of my research). Others lead to external sites or lists that contain a myriad of options to choose from, such as Musicalyst and Every Noise at Once's genre examples (6000+) and the Dictionary of Musical Themes or Messiaen's list of ragas.



ARRANGEMENT (SOUNDBOX)

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

Musical Texture:

- *Monophony*
- *Homophony* (monody, homorhythmic / chorale)
- *Polyphony* (counterpoint)
  - similar / contrary / oblique motion
- *Heterophony*

Events & Gestures:

- *Unique Events*: one-off moments of musical interest
- *Single Events*: short samples / sounds placed strategically (transitions, word-painting, etc.)
- *Single Musical Gestures*: short one-off phrases that break existing patterns or loops
- *Single Processing Gestures*: dramatic one-time effects, throws, automations, etc.

MODIFY

Dynamics:

- Soft / Loud
- Crescendo / Decrescendo
- Add / Remove Accents

Texture:

- Vertical (cluster, stack)
- Horizontal (note values, rests)
- Arpeggio
- Pad
- Alberti Bass
- Ostinato

4 Textural Layers (Moore):

- Melodic Layer
- Bass Layer
- Explicit Beat / Rhythmic Layer
- Harmonic Filler

Listener Focus (spotlights):

- *Complexity / Activity*: more activity draws more attention
- *Novelty*: presented with new and familiar material, new stands out
- *Loudness*: in parts of equal complexity, louder elements stand out
- *Timbral Richness*: in parts of equal complexity, richer stands out (alterations to timbre affect expressive charge)

Note Speed Variation:

- Increase / Decrease Note Density
- Complexity (difference, divisions)

3D Sound Stage:

- *High/Low*: frequency
- *Left/Right*: panning
- *Forward/Back (depth)*: reverb, eq, compression

Sense of Space (Proxemics):

- *Intimate Space*: whispered, dry vocal
- *Private Space*: sung, spoken vocal
- *Social Space*: chorus, gang vocal
- *Public Space*: crowd, shouted vocal

PERSONA (LYRICS, VOICE, POV)

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection
- Lyric Ideas Reservoir
- Word Cloud

GENERATE

- AI Tools (LLMs)
- List all related concepts to your core idea (Collier)
- Boxes (Pattison)

Five Compositional Elements (Pattison)

1. Number of Lines
2. Matched or Unmatched Line Lengths
3. Rhyme Scheme
4. Rhyme Types
5. Rhythms of Lines

Rhyme Scheme:

- *a a*: couplet (stable)
- *x a x a*: quatrain (stable)
- *x x a a*: deceptive cadence (unstable)
- *a b a b*: interleaved (stable)
- *a a b b*: two couplets (stable)
- *a b b a*: retrograde (unbalanced)

Rhyme Types (Pattison):

- *Perfect*: identical vowel and consonant sounds (most stable)
- *Family*: identical vowel, phonetically related consonant (stable)
- *Additive*: adding to open vowels (cry/ride) (stable/unstable)
- *Subtractive*: remove consonant, shorten (speed/free) (stable/unstable)
- *Assonance*: only thing in common is vowel sounds (unstable)
- *Consonance*: different vowels, same ending consonant (most unstable)

MODIFY

Create Contrast (Stolpe):

- Make lines longer / shorter
- Use repetition and internal repetition
- Abstract & Metaphorical vs. Direct & Conversational
- Tense (past / present / future)
- POV (1st / 2nd /3rd singular / plural)

Collier:

- Experiment with personas, perspectives, points of view
- Enjambment
- Word-Painting (Prosody): Paint the harmony and melody with the feelings your words and phrases evoke

PROCESSES

BORROW

GENERATE

Nyman Categories:

- *Chance Determination*: system makes the choices
  - musical dice
  - I Ching
  - random number generator
  - straws / sticks (Cage)
  - coins / cards
- *People*: performer moving through the piece makes the choices
  - Cobra (Zorn)
  - Improvisation
- *Contextual*: unpredictable conditions / variables arise from the music
- *Repetition*: movement generated by extended repetition
  - Piano Phase (Reich)
- *Electronic*:
  - It's Gonna Rain (Reich)
- *Mathematical*: manipulation of material by permutations, addition, subtraction, rate changes, etc.

Branching Grammar:

- L-Systems
- Iterated Function Systems

MODIFY

Ligeti Transformations & Processes:

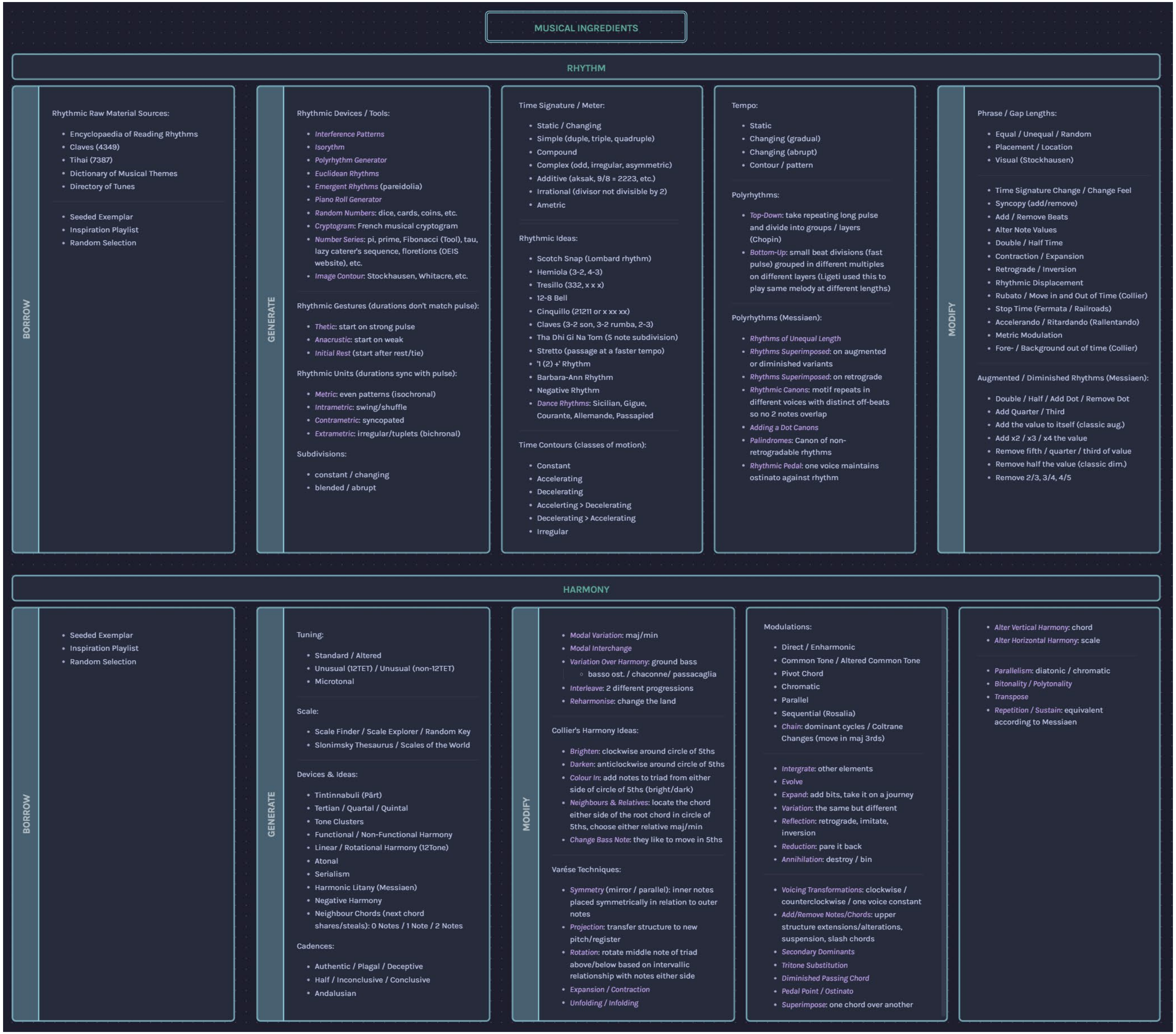
- Expand / Contract Pitch Space
- Increase / Decrease Interval Size
- Hollow Out Tonal Soundscape (then fill the void)
- Increase / Decrease Tempo
- Increase / Decrease Volume
- Emergent Patterns of Accents

Christensen Categories:

- Rule-Determined Transformation
- Goal-Directed Transformation
- Indeterminate Transformation

Varése Transformations:

- *Crystallisation*: take fragments and extrapolate recursively to structure and elements
- *Projection*
- *Rotation*
- *Unfolding & Infolding*



MUSICAL INGREDIENTS

RHYTHM

BORROW

Rhythmic Raw Material Sources:

- Encyclopaedia of Reading Rhythms
- Claves (4349)
- Tihai (7387)
- Dictionary of Musical Themes
- Directory of Tunes

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

Rhythmic Devices / Tools:

- *Interference Patterns*
- *Isorythm*
- *Polyrhythm Generator*
- *Euclidean Rhythms*
- *Emergent Rhythms* (pareidolia)
- *Piano Roll Generator*
- *Random Numbers*: dice, cards, coins, etc.
- *Cryptogram*: French musical cryptogram
- *Number Series*: pi, prime, Fibonacci (Tool), tau, lazy caterer's sequence, floretions (OEIS website), etc.
- *Image Contour*: Stockhausen, Whitacre, etc.

Rhythmic Gestures (durations don't match pulse):

- *Thetic*: start on strong pulse
- *Anacrustic*: start on weak
- *Initial Rest* (start after rest/tie)

Rhythmic Units (durations sync with pulse):

- *Metric*: even patterns (isochronal)
- *Intrametric*: swing/shuffle
- *Contrametric*: syncopated
- *Extrametric*: irregular/tuplets (bichronal)

Subdivisions:

- constant / changing
- blended / abrupt

Time Signature / Meter:

- Static / Changing
- Simple (duple, triple, quadruple)
- Compound
- Complex (odd, irregular, asymmetric)
- Additive (aksak, 9/8 = 2223, etc.)
- Irrational (divisor not divisible by 2)
- Ametric

Rhythmic Ideas:

- Scotch Snap (Lombard rhythm)
- Hemiola (3-2, 4-3)
- Tresillo (332, x x x)
- 12-8 Bell
- Cinquillo (21211 or x xx xx)
- Claves (3-2 son, 3-2 rumba, 2-3)
- Tha Dhi Gi Na Tom (5 note subdivision)
- Stretto (passage at a faster tempo)
- '1 (2) +' Rhythm
- Barbara-Ann Rhythm
- Negative Rhythm
- *Dance Rhythms*: Sicilian, Gigue, Courante, Allemande, Passapied

Time Contours (classes of motion):

- Constant
- Accelerating
- Decelerating
- Accelerting > Decelerating
- Decelerating > Accelerating
- Irregular

Tempo:

- Static
- Changing (gradual)
- Changing (abrupt)
- Contour / pattern

Polyrhythms:

- *Top-Down*: take repeating long pulse and divide into groups / layers (Chopin)
- *Bottom-Up*: small beat divisions (fast pulse) grouped in different multiples on different layers (Ligeti used this to play same melody at different lengths)

Polyrhythms (Messiaen):

- *Rhythms of Unequal Length*
- *Rhythms Superimposed*: on augmented or diminished variants
- *Rhythms Superimposed*: on retrograde
- *Rhythmic Canons*: motif repeats in different voices with distinct off-beats so no 2 notes overlap
- *Adding a Dot Canons*
- *Palindromes*: Canon of non-retrogradable rhythms
- *Rhythmic Pedal*: one voice maintains ostinato against rhythm

MODIFY

Phrase / Gap Lengths:

- Equal / Unequal / Random
- Placement / Location
- Visual (Stockhausen)

- Time Signature Change / Change Feel
- Syncopy (add/remove)
- Add / Remove Beats
- Alter Note Values
- Double / Half Time
- Contraction / Expansion
- Retrograde / Inversion
- Rhythmic Displacement
- Rubato / Move in and Out of Time (Collier)
- Stop Time (Fermata / Railroads)
- Accelerando / Ritardando (Rallentando)
- Metric Modulation
- Fore- / Background out of time (Collier)

Augmented / Diminished Rhythms (Messiaen):

- Double / Half / Add Dot / Remove Dot
- Add Quarter / Third
- Add the value to itself (classic aug.)
- Add x2 / x3 / x4 the value
- Remove fifth / quarter / third of value
- Remove half the value (classic dim.)
- Remove 2/3, 3/4, 4/5

HARMONY

BORROW

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

Tuning:

- Standard / Altered
- Unusual (12TET) / Unusual (non-12TET)
- Microtonal

Scale:

- Scale Finder / Scale Explorer / Random Key
- Slonimsky Thesaurus / Scales of the World

Devices & Ideas:

- Tintinnabuli (Pärt)
- Tertian / Quartal / Quintal
- Tone Clusters
- Functional / Non-Functional Harmony
- Linear / Rotational Harmony (12Tone)
- Atonal
- Serialism
- Harmonic Litany (Messiaen)
- Negative Harmony
- Neighbour Chords (next chord shares/steals): 0 Notes / 1 Note / 2 Notes

Cadences:

- Authentic / Plagal / Deceptive
- Half / Inconclusive / Conclusive
- Andalusian

MODIFY

- *Modal Variation*: maj/min
- *Modal Interchange*
- *Variation Over Harmony*: ground bass
    - basso ost. / chaconne/ passacaglia
- *Interleave*: 2 different progressions
- *Reharmonise*: change the land

Collier's Harmony Ideas:

- *Brighten*: clockwise around circle of 5ths
- *Darken*: anticlockwise around circle of 5ths
- *Colour In*: add notes to triad from either side of circle of 5ths (bright/dark)
- *Neighbours & Relatives*: locate the chord either side of the root chord in circle of 5ths, choose either relative maj/min
- *Change Bass Note*: they like to move in 5ths

Varése Techniques:

- *Symmetry* (mirror / parallel): inner notes placed symmetrically in relation to outer notes
- *Projection*: transfer structure to new pitch/register
- *Rotation*: rotate middle note of triad above/below based on intervallic relationship with notes either side
- *Expansion / Contraction*
- *Unfolding / Infolding*

Modulations:

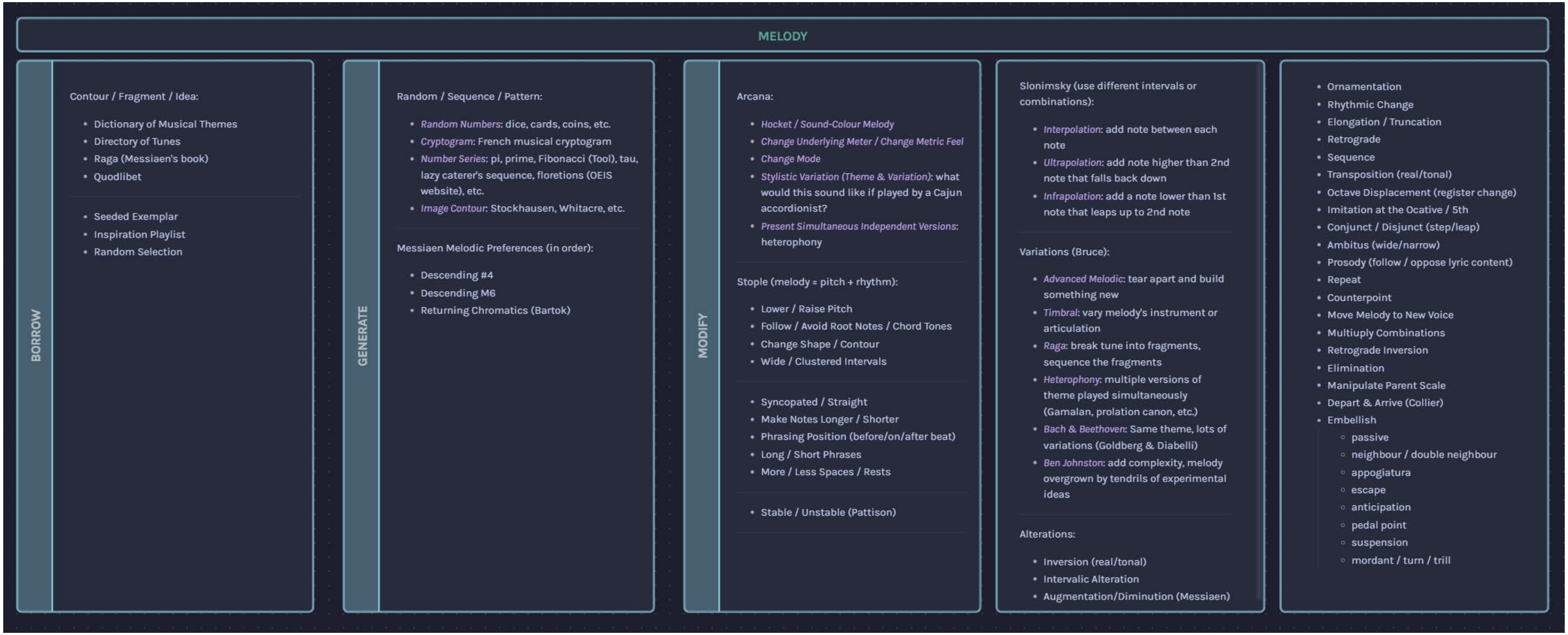
- Direct / Enharmonic
- Common Tone / Altered Common Tone
- Pivot Chord
- Chromatic
- Parallel
- Sequential (Rosalia)
- *Chain*: dominant cycles / Coltrane Changes (move in maj 3rds)

- *Intergrate*: other elements
- *Evolve*
- *Expand*: add bits, take it on a journey
- *Variation*: the same but different
- *Reflection*: retrograde, imitate, inversion
- *Reduction*: pare it back
- *Annihilation*: destroy / bin

- *Voicing Transformations*: clockwise / counterclockwise / one voice constant
- *Add/Remove Notes/Chords*: upper structure extensions/alterations, suspension, slash chords
- *Secondary Dominants*
- *Tritone Substitution*
- *Diminished Passing Chord*
- *Pedal Point / Ostinato*
- *Superimpose*: one chord over another

- *Alter Vertical Harmony*: chord
- *Alter Horizontal Harmony*: scale

- *Parallelism*: diatonic / chromatic
- *Bitonality / Polytonality*
- *Transpose*
- *Repetition / Sustain*: equivalent according to Messiaen



MELODY

BORROW

Contour / Fragment / Idea:

- Dictionary of Musical Themes
- Directory of Tunes
- Raga (Messiaen's book)
- Quodlibet

- Seeded Exemplar
- Inspiration Playlist
- Random Selection

GENERATE

Random / Sequence / Pattern:

- *Random Numbers*: dice, cards, coins, etc.
- *Cryptogram*: French musical cryptogram
- *Number Series*: pi, prime, Fibonacci (Tool), tau, lazy caterer's sequence, floretions (OEIS website), etc.
- *Image Contour*: Stockhausen, Whitacre, etc.

Messiaen Melodic Preferences (in order):

- Descending #4
- Descending M6
- Returning Chromatics (Bartok)

MODIFY

Arcana:

- *Hocket / Sound-Colour Melody*
- *Change Underlying Meter / Change Metric Feel*
- *Change Mode*
- *Stylistic Variation (Theme & Variation)*: what would this sound like if played by a Cajun accordionist?
- *Present Simultaneous Independent Versions*: heterophony

Stople (melody = pitch + rhythm):

- Lower / Raise Pitch
- Follow / Avoid Root Notes / Chord Tones
- Change Shape / Contour
- Wide / Clustered Intervals

- Syncopated / Straight
- Make Notes Longer / Shorter
- Phrasing Position (before/on/after beat)
- Long / Short Phrases
- More / Less Spaces / Rests

- Stable / Unstable (Pattison)

Slonimsky (use different intervals or combinations):

- *Interpolation*: add note between each note
- *Ultrapolation*: add note higher than 2nd note that falls back down
- *Infrapolation*: add a note lower than 1st note that leaps up to 2nd note

Variations (Bruce):

- *Advanced Melodic*: tear apart and build something new
- *Timbral*: vary melody's instrument or articulation
- *Raga*: break tune into fragments, sequence the fragments
- *Heterophony*: multiple versions of theme played simultaneously (Gamalan, prolation canon, etc.)
- *Bach & Beethoven*: Same theme, lots of variations (Goldberg & Diabelli)
- *Ben Johnston*: add complexity, melody overgrown by tendrils of experimental ideas

Alterations:

- Inversion (real/tonal)
- Intervalic Alteration
- Augmentation/Diminution (Messiaen)

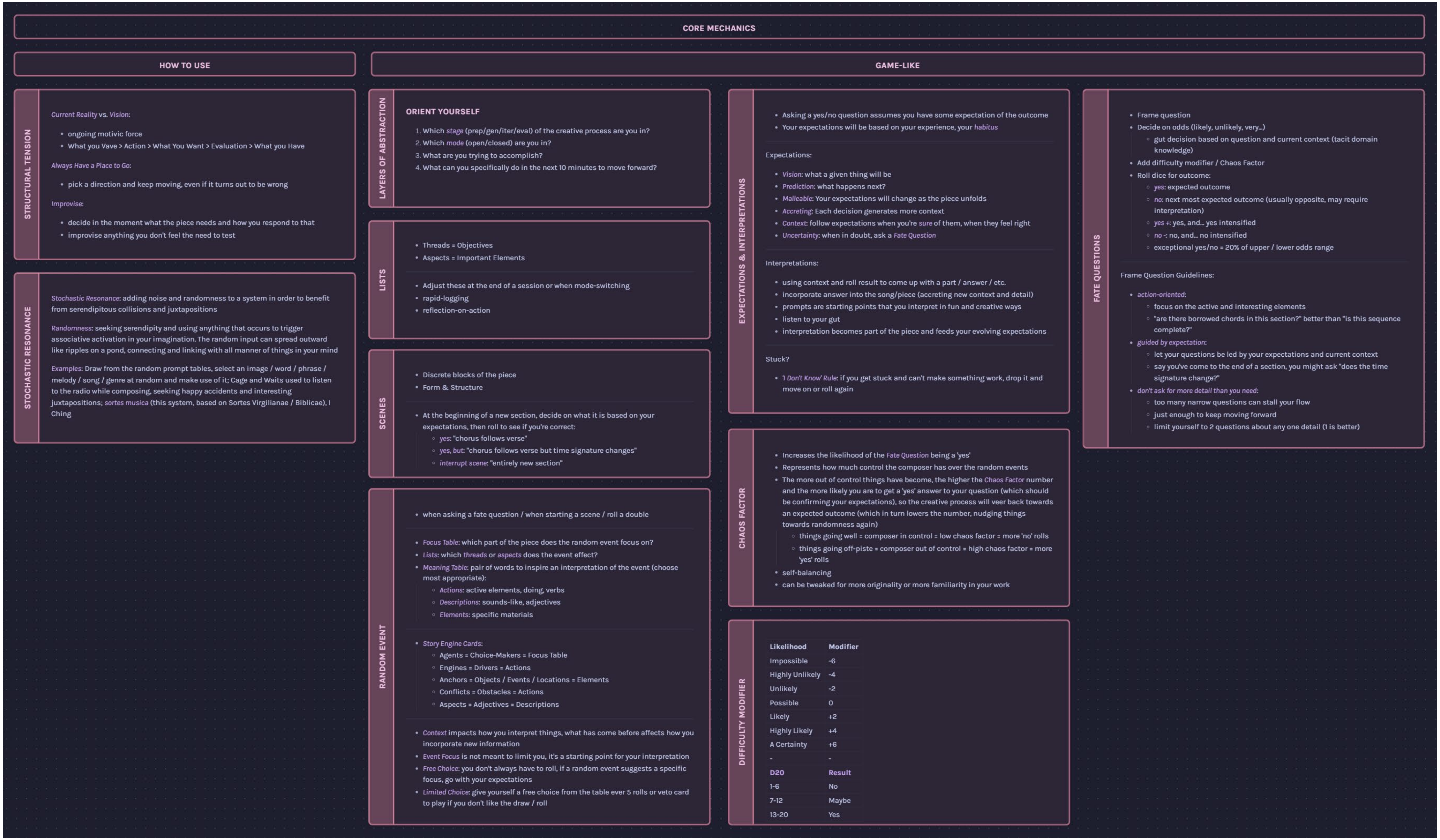
- Ornamentation
- Rhythmic Change
- Elongation / Truncation
- Retrograde
- Sequence
- Transposition (real/tonal)
- Octave Displacement (register change)
- Imitation at the Ocative / 5th
- Conjunct / Disjunct (step/leap)
- Ambitus (wide/narrow)
- Prosody (follow / oppose lyric content)
- Repeat
- Counterpoint
- Move Melody to New Voice
- Multiply Combinations
- Retrograde Inversion
- Elimination
- Manipulate Parent Scale
- Depart & Arrive (Collier)
- Embellish
  - passive
  - neighbour / double neighbour
  - appogiatura
  - escape
  - anticipation
  - pedal point
  - suspension
  - mordant / turn / trill

Fig. 17 - Musical Ingredients (Arrangement, Lyrics, Processes) (p.17)

Fig. 18 - Musical Ingredients (Rhythm, Harmony) (p.18)

Fig. 19 - Musical Ingredients (Melody) (p.19)

The following figures show some of the ways in which a composer might use The Composition Engine. The 'How to Use' cards represent the most common use to which I put the system. The Game-Like mechanics are a much later addition and are an element that I am still in the process of refining. My favourite aspects of this section are the 'Fate Questions' and using expectations to weight probabilities. Being able to explicitly identify what I expect the next part of a song to be or what the melody might sound like and then choose to lean into those expectation or defy them ties into *reflection-in-action* and Practice-as-Research concepts (see commentary for further details).



CORE MECHANICS

HOW TO USE

STRUCTURAL TENSION

Current Reality vs. *Vision*:

- ongoing motivic force
- What you Vave > Action > What You Want > Evaluation > What you Have

Always Have a Place to Go:

- pick a direction and keep moving, even if it turns out to be wrong

Improvise:

- decide in the moment what the piece needs and how you respond to that
- improvise anything you don't feel the need to test

STOCHASTIC RESONANCE

Stochastic Resonance: adding noise and randomness to a system in order to benefit from serendipitous collisions and juxtapositions

Randomness: seeking serendipity and using anything that occurs to trigger associative activation in your imagination. The random input can spread outward like ripples on a pond, connecting and linking with all manner of things in your mind

Examples: Draw from the random prompt tables, select an image / word / phrase / melody / song / genre at random and make use of it; Cage and Waits used to listen to the radio while composing, seeking happy accidents and interesting juxtapositions; *sortes musica* (this system, based on Sortes Virgilianae / Biblicae), I Ching

GAME-LIKE

LAYERS OF ABSTRACTION

ORIENT YOURSELF

1. Which *stage* (prep/gen/iter/eval) of the creative process are you in?
2. Which *mode* (open/closed) are you in?
3. What are you trying to accomplish?
4. What can you specifically do in the next 10 minutes to move forward?

LISTS

- Threads = Objectives
- Aspects = Important Elements

- Adjust these at the end of a session or when mode-switching
- rapid-logging
- reflection-on-action

SCENES

- Discrete blocks of the piece
- Form & Structure

- At the beginning of a new section, decide on what it is based on your expectations, then roll to see if you're correct:
    - *yes*: "chorus follows verse"
    - *yes, but*: "chorus follows verse but time signature changes"
    - *interrupt scene*: "entirely new section"

RANDOM EVENT

- when asking a fate question / when starting a scene / roll a double

- *Focus Table*: which part of the piece does the random event focus on?
- *Lists*: which *threads* or *aspects* does the event effect?
- *Meaning Table*: pair of words to inspire an interpretation of the event (choose most appropriate):
    - *Actions*: active elements, doing, verbs
    - *Descriptions*: sounds-like, adjectives
    - *Elements*: specific materials

- *Story Engine Cards*:
    - Agents = Choice-Makers = Focus Table
    - Engines = Drivers = Actions
    - Anchors = Objects / Events / Locations = Elements
    - Conflicts = Obstacles = Actions
    - Aspects = Adjectives = Descriptions

- *Context* impacts how you interpret things, what has come before affects how you incorporate new information
- *Event Focus* is not meant to limit you, it's a starting point for your interpretation
- *Free Choice*: you don't always have to roll, if a random event suggests a specific focus, go with your expectations
- *Limited Choice*: give yourself a free choice from the table ever 5 rolls or veto card to play if you don't like the draw / roll

EXPECTATIONS & INTERPRETATIONS

- Asking a yes/no question assumes you have some expectation of the outcome
- Your expectations will be based on your experience, your *habitus*

Expectations:

- *Vision*: what a given thing will be
- *Prediction*: what happens next?
- *Malleable*: Your expectations will change as the piece unfolds
- *Accreting*: Each decision generates more context
- *Context*: follow expectations when you're *sure* of them, when they feel right
- *Uncertainty*: when in doubt, ask a *Fate Question*

Interpretations:

- using context and roll result to come up with a part / answer / etc.
- incorporate answer into the song/piece (accreting new context and detail)
- prompts are starting points that you interpret in fun and creative ways
- listen to your gut
- interpretation becomes part of the piece and feeds your evolving expectations

Stuck?

- *'I Don't Know' Rule*: if you get stuck and can't make something work, drop it and move on or roll again

CHAOS FACTOR

- Increases the likelihood of the *Fate Question* being a 'yes'
- Represents how much control the composer has over the random events
- The more out of control things have become, the higher the *Chaos Factor* number and the more likely you are to get a 'yes' answer to your question (which should be confirming your expectations), so the creative process will veer back towards an expected outcome (which in turn lowers the number, nudging things towards randomness again)
    - things going well = composer in control = low chaos factor = more 'no' rolls
    - things going off-piste = composer out of control = high chaos factor = more 'yes' rolls
- self-balancing
- can be tweaked for more originality or more familiarity in your work

DIFFICULTY MODIFIER

Likelihood	Modifier
Impossible	-6
Highly Unlikely	-4
Unlikely	-2
Possible	0
Likely	+2
Highly Likely	+4
A Certainty	+6
-	-
D20	**Result**
1-6	No
7-12	Maybe
13-20	Yes

FATE QUESTIONS

- Frame question
- Decide on odds (likely, unlikely, very…)
    - gut decision based on question and current context (tacit domain knowledge)
- Add difficulty modifier / Chaos Factor
- Roll dice for outcome:
    - *yes*: expected outcome
    - *no*: next most expected outcome (usually opposite, may require interpretation)
    - *yes +*: yes, and… yes intensified
    - *no -*: no, and… no intensified
    - exceptional yes/no = 20% of upper / lower odds range

Frame Question Guidelines:

- *action-oriented*:
    - focus on the active and interesting elements
    - "are there borrowed chords in this section?" better than "is this sequence complete?"
- *guided by expectation*:
    - let your questions be led by your expectations and current context
    - say you've come to the end of a section, you might ask "does the time signature change?"
- *don't ask for more detail than you need*:
    - too many narrow questions can stall your flow
    - just enough to keep moving forward
    - limit yourself to 2 questions about any one detail (1 is better)

Fig. 20 - Core mechanics and how to use The Composition Engine