

Measure and Intent

THESIS: Measurement cannot be disentangled from intent: an “effective” measurement is not an effective measurement of an objective matter, rather, it is an effective *objectification of an intent* to make a matter objective. In the text that follows, we conceptualize the mathematical notion of a “spectrum of operators” in order to interrogate the entanglement of measurement and intent.

What is a spectrum of operators?

To understand what the term “spectrum of operators” refers to, let’s regard a square.



Now, we are all very familiar with the spectrum of rotation operators under which a square is “invariant”, which includes the 0° rotation, the 90° rotation, the 180° rotation, the 270° rotation, the 360° rotation, the 450° rotation, etc. To say that a square is “invariant” under all the different rotations in this spectrum is to say that one cannot tell the difference between a square rotated 0° , a square rotated 90° , a square rotated 180° , a square rotated 270° , a square rotated 360° , a square rotated 450° , and so on for every rotation that is a factor of 90° .

The “fundamental” or “ground” rotation operator for a square is the rotation operator of the lowest degree: the 0° rotation. That being said, however, the rotational timbre of a square, as defined by the rotation operators under which it is invariant, is determined by the whole spectrum of rotation operators under which a square is invariant and not just the “fundamental” or “ground” rotation operator. Indeed, the “fundamental” or “ground” rotation operators for a circle, a triangle, and a borromean knot are also 0° but the rotational timbre of each of these shapes is different from that of a square.

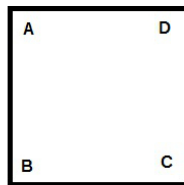
What’s more, it is not just the different rotation operators *included* in the spectrum of operators but also those *excluded* from the spectrum of operators that defines the rotational timbre of a square. The spectrum of rotation operators under which a circle is invariant also includes the 0° rotation, the 90° rotation, the 180° rotation, the 270° rotation, the 360° rotation, the 450° rotation, and every other rotation that is a factor of 90° . This mutual inclusion however, doesn’t give a circle the same rotational timbre as a square. The square has a different timbre because the spectrum of operators under which a square is invariant excludes the 1° rotation, the 2° rotation, the 3° rotation, the 5° rotation, the 7° rotation, and many others, whereas the spectrum of operators under which a circle is invariant includes all of the above and any and every conceivable rotation. Now, let us add a third shape to the mix and consider the spectrum of rotations under which an equilateral triangle remains invariant, which includes the 120° rotation, 240° rotation, the 360° rotation, etc. How does the rotational timbre of the equilateral triangle differ from that of the circle and the square?

Now, let's complicate matters further by bringing time intervals and sense impressions into the mix. Once more regard a square:

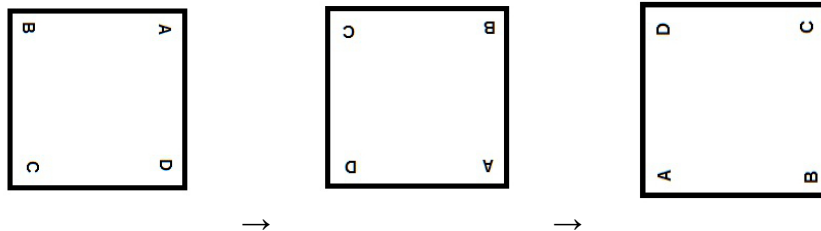


Now, you and I, regarding the square above, are likely to assume that the square is undergoing a 0° rotation, its "fundamental" or "ground" rotation, in the time interval between each and every sense impression that we have of it. That being said, however, it is *possible* that the square has undergone a 180° rotation, then a 90° rotation, then a 450° rotation, then a 900° rotation, and then a 360° rotation in the time intervals between our sense impressions of it. Now, you might scoff at me and say, "I suppose that is *possible* but that is totally friggin' *improbable*." You might even say, "I can prove to you that there is no friggin' way that the square above has undergone, for instance, a 90° rotation in the time intervals between sense impressions of it." And I might say to you, "Prove it!"

You "prove it" by marking the corners of the square like this



Then you argue that if this square was rotating 90° during some of the time intervals between sense impressions of it we would see something like this happening:



Insofar as the A remains top left, B bottom left, C bottom right, and D top right, we know for certain that the square could only be rotating 360° or by some factor 360° in the time interval between sense impressions. There is no way that it has rotated 90° .

How do I respond to this "proof"? Well, I say that by marking the corners in the manner that you have, you have produced a different shape with a different rotational timbre. You've proven nothing about the square, you've only proven something about the *square with alphabetically ordered corners*. What made the square "what-it-was", rotationally speaking, was the *possibility* that it might have undergone any and every rotation under which it is invariant, any and every rotation that is a factor of 90° , in the time interval between any and every sense impression of it.

Indeed, I say that *you have created a new shape out of the square*, a new shape that I call “the square with alphabetically ordered corners”. The “square with alphabetically ordered corners” has a different and more exclusive spectrum of rotation operators under which is invariant, a spectrum of rotation operators that excludes any rotation which is *not* a factor of 360° . So, I argue that you have not proven that it is **impossible** for the square to rotate 90° in the time intervals between sense impressions of it: you have only proven that it is **improbable** that the “square with alphabetically ordered corners” will rotate 90° in the time intervals between sense impressions of it. In other words, I say that the “square with alphabetically ordered corners” does not objectively prove matters regarding the rotation of the square, rather, it effectively objectifies your intent to make matters regarding the rotation of the square objective.

We can regard this alphabetical marking of the corners of the square as the paradigm of “taking a measure”. Which is to say, in other words, we can say that **to take the measure of a matter is to make that matter’s spectrum of operators MORE EXCLUSIVE**. This, in turn, would imply that those who would take the measure of a matter should ask themselves the following questions, “*What possibilities am I excluding from the matter? How precisely am I excluding them? Why am I excluding them?*” At the same time, however, to take the measure of a matter according to this paradigm is also a creative or *ontogenic* practice: **to take the measure of a matter is to make something out of that matter**, as we made the “square with alphabetically ordered corners” out of the initial square. Thus, one must supplement the questions above with the following questions, “*What am I making out of the matter? How precisely am I making it? Why am I making it?*”

Regarding Matters of Sustainable Development

Let us "apply" the lessons above by considering UN Sustainable Development Goals.



We regard each of these goals as an attempt to take the measure of seventeen different matters: (i) the matter of poverty, (ii) the matter of hunger, (iii) the matter of health and well being, (iv) the matter of education, (v) the matter of gender equality, (vi) the matter of clean water and sanitation, [...] and, last but not least, (xvii) the matter of international partnership supporting the SDGs.

When an organization like, say, [SDG Impact](#) takes the measure of these different matters, we must ask the question "What possibilities is the organization attempting to exclude from these matters and what are they making of these matters by excluding these possibilities?" The latter question is easy to answer for the organization under consideration: SDG Impact is trying to make these matters into "matters of capital investment". On their website they state their mission thus, "Empowering investors with clarity, insights and tools to achieve the Sustainable Development Goals (SDGs)." Now, the question that follows is this, by taking measures that make matters of sustainable development into matters of capital investment what are they excluding from matters of sustainable development?

One thing immediately comes to mind: insofar as sustainable development is a matter of capital investment, it is a matter for those who have capital to invest and not a matter for those who don't have capital to invest. In other words, the impacts of actions taken by those who don't have capital to invest are going to be excluded by the measures taken by SDG Impact unless they can be connected back to capital investment. Another way of putting this: any operator on sustainable development that is not a factor of capital investment will be excluded by SDG Impact from the spectrum of operators that can influence sustainable development.

Again, recognize that there is no "hands off" approach to taking the measure of a matter. To take the measure of a matter is to *get a handle* on a matter, to *manipulate* a matter. An organization like [SDG Impact](#) is not trying to measure an objective fact when it measures the impact of capital investment on sustainable development, rather, such an organization is effectively objectifying its intent to make

capital investment have an impact on sustainable development. SDG Impact *intends* to make capital investment have an objective impact on sustainability, which sounds all well and good, but to make capital investment have an objective impact means excluding that which obscures the impact of capital investment. Mightn't that which obscures the impact of capital investment be more impactful with respect to achieving sustainable development goals than capital investment ever will be?

If we don't want sustainable development to be the exclusive purview of those with capital to invest, how would we rather measure sustainable development? Imagine another organization, call it "SDGs for Communities", with the following mission, "Empowering *grassroots community organizers* with clarity, insights and tools to achieve the SDGs." Wouldn't such an organization would make sustainable development the exclusive purview of grassroots community organizers? Wouldn't capital investment be excluded from the measures taken by SDGs for Communities when capital investment is not connected to grassroots community organizing? Another way of putting this: wouldn't SDGs for Communities exclude from its measurements any operator on sustainable development that was not a factor of grassroots community organizing from the spectrum of operators that can influence sustainable development? Ay, and mightn't it be better to make matters of sustainable development into matters of grassroots community organizing rather than into matters of capital investment? Mightn't it be better to exclude capital investments that have no connection to grassroots community organizing from matters of sustainable development?

Substrates, Transformations, Information(s)

So, again, an “effective” measurement is never an effective measurement of an “objective” matter but, rather, it is an effective *objectification of an intent* to make a matter objective. This is not a novel observation, as this observation characterizes the oeuvre of Michel Foucault from *Madness and Civilization* (1960) through to *The History of Sexuality* (1976-1984). What we hope is novel about our articulation of this profound observation is our framing of it with the notion that the *substrate* of a measurement is an *indeterminate spectrum* as opposed to a determinate discretum or a determinate continuum. Indeed, to be more precise, we hold that (i) indeterminate spectra are the *substrates* of measurement, (ii) measurements are the discretizations and continuations that *trans-form* a substrate and, concomitantly, (iii) determinate discreta and determinate continua are the *in-formation(s)* produced by measurements, produced by discrete or continuous trans-formations of an indeterminate spectral substrate .

Our proposition is that intent is to be discovered by “processing measurements”, by interrogating the discrete or continuous trans-formations of a spectral substrate. Which is to say, in other words, that intent is **not** to be discovered by “processing the results of measurements”, by interrogating discrete bits or continuous flows of in-formation that measurements produce. This claim is immensely important given that we live in a society in which in-formation technologies prevail: our societies have become oblivious to intent because of their obsession with in-formation technologies, technologies that process in-formation as opposed to trans-formations. Indeed, the pride that our “in-formation age” societies take in “data driven decision making” is pride taken in a decision making practice that does not stop to question the intent that drives decision makers to make their decisions. Many of the crises that our societies face are said to be the “unintended consequences” of decisions that we have made, but that is not at all the case. The many crises that we face are, in fact, the result of our not stopping to question our intentions, the result of not our societies’ not attending to intent. If our societies are to attend to intent, and it is becoming more and more imperative that they do so, our societies will need to shift their focus from in-formation technologies to *trans-formation technologies*: technologies that process trans-formations as opposed to in-formation(s).

Trans-formation technologies encourage their users to become designers/makers by encouraging them to attend to what, when, where, why, and how a trans-formation, no matter whether continuous or discrete, makes a spectrum more or less exclusive in order to yield information. This is to say, in other words, that trans-formation technologies encourage their users to become designers/makers by encouraging them to attend to intent. In this way, trans-formation technologies are what we refer to as [prototypes](#).