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Towards a surveillant reality in tennis

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Summary

Here we attempt to present an application of epistemologically significant concepts that have already been described in depth in previous works. First and foremost, we refer to the dual paired method(s) of epistēmē, which is critically different from the scientific method due to a very common misconception ubiquitous among scholars and academics al over; but we also refer to surveillance, theory and truth, as well as the two new, save relevant, concepts of surveillant reality and experiential reality. The example is taken from tennis, a field to which one of the authors regularly contributes. We shall attempt to explore the ways in which the dual paired method of epistēmē is applied to sports science (in tennis) and, based on that, to clarify the concept and the differences between surveillant reality and experiential reality.

Keywords: Surveillance; experiential reality; dual-paired method of epistēmē, analysis; synthesis; abstraction; structure.

Introduction

This paper is both relevant and irrelevant to tennis. Having spoken with hundreds, if not thousands, of tennis trainers, the first author feels inclined to fall into the cognitive fallacy of overgeneralizing both their apparent lack of knowledge regarding the methodology of science and their denial to hear about it. Unfortunately, what is happening is not simply a matter of professional perversion; it is just another characteristic case of gangs / syndicates controlling a field, setting as priority money and power in all tennis clubs of which the author is aware. This is to explain why no complete system has ever been produced for the development of tennis players / coaches. But let us not be tennis-racists; the same kind of behaviour is (hyper) normalized in other disciplines as well, science being no exception. This paper fills a huge gap not only in tennis literature, but also in all fields that would like to have a more concrete example of what this "surveillance" is, making it so different from experience. One could go as far as to say that the author uses his tennis expertise to provide a well-structured example of what surveillance is mostly for people unrelated / indifferent to tennis altogether, using tennis as a simplistic lab rat. Still, both tennis coaches (extremely well-educated) and philosophers alike should be equally astonished by what they have been missing – especially upon realizing its vigour and simplicity. Surveil-

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lance is a concept that has been crying out loud to take its rightful position side-by-side to experience; however, only now did Lekkas et al present this concept to the world [1], [2].

A major point of this paper, maybe the most significant one, is described in this observation:
People sit in front of an empty fireplace and say: "give me heat and then I'll give you some wood".

What is described in the aforementioned phrase is a hindmost-foremost (*σχήμα πρωθύστερον*). That (a hindmost-foremost) is the methodology used in the West in doing an activity called "science". However, without surveillance, no science, no epistēmē can be said to exist in the first place. As an example, here, we shall explore the way in which one ought to develop a model for tennis shots. Where can someone derive the technique of tennis shots? From tennis players? Then the role of trainers is merely to copy good athletes and the saying "whoever cannot play teaches" becomes true. From coaches? And where have the latter taken it from? Books? And where have the books taken it from? A computer? And where has the input of the computer come from? Players? One or many? If it is from one good adult player, how is it generalizable to many players (and even to children)? And, if it is copied from many players, then how does this probabilistic model apply to specific individuals? By chance? Maybe in some form of mathematics "in a galaxy far-far away" a probabilistic model, if it is very successful, automatically becomes deterministic? In this galaxy, however, even if we wanted something really bad, like creating deterministic models out of probabilistic ones, the whole universe is not going to conspire and give us that. Is this type of science not a joke?

One should realize that, by treating experience as the only possible input for science, the only way would be to watch / record a specific player hitting the ball (or many players and extract an average). However, this is not "scientific". We are not supposed to do science in order to merely record empirically-derived data, rename them "scientific" and then sell them in a glorified, mythical and catchy form called "science". All too often, in this hindmost-foremost fashion, scientists "analyze" a phenomenon thus extracting from it a "theory" without realizing that such a "theory", no matter how celebrated and glorified it gets, is nothing more than the precondition for the imminent processing of the phenomenon; any theory can only be the context, not the content (the result). This (going backwards, from observation to models) is called "begging the question", it is a logical error and supposedly we know better than that. But do we?

Apart from watching players, the *only* other option towards having an actual image of what a tennis shot looks like is through surveillance, the (forgotten) counterpart of experience. There is logically no other way. Before we describe (in brief here) what surveillance is, let us say what it is *not*: crypto-experience. Inserting into a computer as input data from players and receiving as output even meaningful information about technique is *not* surveillance but rather a deceitful hybrid of experience and surveillance without any proper distinction. We shall provide here the typical definition of surveillance and then proceed in my explanation opting to reach an understanding of what *surveillant reality* is. Surveillance is the process of applying the output of experience-derived observations, after they have been stripped off of their semantic content through abstraction, and after the dual paired method of epistēmē is applied to this input, back to reality through a process called *interpretation*, i.e., (meta-lingual) name-giving. The latter is the process of assigning observations to models (that have been produced by abstraction from reality) via tools such as *working hypotheses*. Let us see how this is done.

The ontology

As it has been described in previous works of the same author(s), the ontology of Theoretical Epistemology is novel, in the sense that it introduces new terms (e.g. surveillance, surveillant reality, theoretics), but also old terms with an *improved* "better" meaning (better in terms of consistency, precision and historical accuracy, e.g. theory, abstraction, structure) [3], [4]. Among this plethora of terms, centrally located is the pair of experi-

ence-surveillance. It is surveillance that we shall attempt to clarify, referring to that end to the following terms:

1. analysis: breaking down an entity into its constituent parts / some parts;
2. synthesis: combining analytical parts towards creating a composition;
3. abstraction: inclusion in supersets (forming common-property-based categories);
4. structure: creation of subsets (singling out common-property-based subcategories).

There are also these valid combinations (to be more thoroughly presented in a future work):

1. *structural analysis*: when doing analysis based on structural criteria;
2. *abstractive analysis*: when doing analysis based on abstractive criteria;
3. *structural synthesis*: when doing synthesis based on structural criteria;
4. *abstractive synthesis*: when doing synthesis based on abstractive criteria;
5. *analytical structure*: when doing structure based on analytical criteria;
6. *synthetic structure*: when doing structure based on synthetic criteria;
7. *analytical abstraction*: when doing abstraction with analytical criteria;
8. *synthetic abstraction*: when doing abstraction based on synthetic criteria.

Obviously, one cannot have:

- analytical synthesis / synthetic analysis;
- abstractive structure / structural abstraction.

Surveillance is the result of the employment of this dual-paired method of analysis-synthesis & abstraction-structure (and all their derivatives): not all together and everywhere, but whichever selection of this list is deemed specifically appropriate. As to the model of reality acquired thus, the authors have decided to call it *surveillant reality*[1] and it is critically different from the model of reality which we humans (more or less) tacitly construct based mostly on the input from our senses.[2] There are many ways to explore these concepts and indeed, many such ways have been employed in previous works by the author. Here, we shall explain the (actually) dual pairwise method of epistēmē (analysis-synthesis & abstraction-structure) which gives rise to surveillance. Let us begin with experience to establish what we already know, either implicitly or explicitly.

Experience

Experience is the psychological, cognitive and physical imprint that is gained through our interaction with the world. Experience is *a priori* in the sense that it forms the background / the stage on which we further interact with the world. It is *specific* (even though it may be *generalized* – which might come at the cost of overgeneralization).

Now, let us attempt to make all these concepts clear through our tennis-related example. We shall focus only on the technical model of tennis, i.e., what is the way to "discover" or more generally get to know what is the movement which one does in order to hit the ball with the racket. Let us keep in mind that the discussion regarding technique is somewhat different from the discussion regarding *what* constitutes "proper technique", i.e., the *best* movement in order to hit the ball, and *a lot* different from the discussion regarding *how* to teach proper technique. It should be evident that for all other questions (such as the questions regarding what proper technique actually is and how to teach this proper technique) a similar process to the one presented next would be employed. Moreover, this is by no means a full and in-depth analysis of tennis technique; it is just an example: as deep as needed for grasping the notions presented, but as superfi-

1. Elsewhere, we have stressed the difference between reality and truth; the former describes "the world out there", whereas the latter is an abstract valence attributed to propositions.

2. The first organized presentation of surveillance (vs. experience) first appeared in: Elements of epistemic method and its application: Analytic method and abstract thought". Chapter 2, in D. Lekkas et al., Arts II: Overview of Greek Music and Dance, Vol. I: Dialectic Associations – Theory of Greek Music, pp. 83 – 114. Greek Open University. Patras 2003. (Greek)

cial as possible for maintaining simplicity.
So, how would experience serve us? By observing a game of tennis, or even better, many of them, or even better, a profusion of them, one will be able to see the various shots made by professionals, experts, intermediate or even beginner players. Through a host of mechanisms studied by the neurosciences (e.g. with the aid of mirror neurons [5]), one creates a mental model of how a shot looks like for each specific instance. This also may be called "implicit learning" of the technique. It is so powerful that non-experts (spectators) have been observed to have been capable of predicting the best tactical choice that a professional player should make in the forthcoming shot while watching a match [6]. Anyway, this idea which someone develops about how tennis shots look is the first one of the two approximative approaches to reality; and it is called *experiential reality*. It is not reality *per se* – it could never be such a thing directly observed without the distortion from the *fraud of the senses* –; it is a vision of our own personal experience, an *a priori* (in the sense discussed earlier) mental representation of what this external reality looks like, based on experience, i.e., based on non-qualified observations.
This type of acquisition of knowledge, and of ways to describe of the world, resembles a reportage. It is raw, primary, unscripted, coarse and unsophisticated – or as sophisticated and clever as the reporter can see it and present it. The world would know an event in an *a priori*-like, arbitrary way, without any processing – we say arbitrary since the viewer will only get to see what the cameraman has happened to have recorded at the site of the event. On the other hand, surveillance would look like a documentary, based on an *a priori* script (that would be the dual-paired method of epistēmē); and its final result would be a highly elaborated narrative, using multiple sources of visual and other information, taken from both the present and the past, processed to their finest detail, thus revealing an *a posteriori* representation of the world.

Surveillance

"Performance analysis" could have also been the title of this paper; however, that would have been deceitful. By this term, "analysis", what is meant in the literature is an undifferentiated glorious gallimaufry of separate processes that are not to be mixed, or more precisely, it is *forbidden* for them to be mixed. There are already some approaches in the literature struggling to make sense of the observed phenomena when dealing with it experientially. Such approaches include i. mechanisms (*cf*. mechanical philosophy [7][8]) and ii. kinesiology. However, the usual problem regarding the understanding of what these tools and concepts offer us is that they are to be used *after* the application of the dual-paired method of analysis-synthesis and abstraction-structure; the problem is one of both hierarchy and existence. It is to be realized that there *is* this methodology of epistēmē and that it is *prior* to anything else.
A posteriori surveillance only comes *after* processing and moving beyond experience and leaving it behind and *forgetting* about it; at that final stage of surveillance, all that preceded and was recorded becomes irrelevant or merely a matter of historical significance. It is *general*, even though it can be specialized / instantiated under proper restrictions. What follows is a series of examples aiming at making the basic constituents of the dual-paired method of epistēmē comprehensible.

1 Analysis

As always, by convention, we select an instance which is to be analyzed. There are no definitive external signals as to what qualifies something as an element to be analyzed. In some case, element "A" may be the start of analysis; in some other case, it can be its end-product. An analyzable entity must be specific in space and time, irrespective of its being something as solid as a table or as elusive as a piano recital. Here we select a specific instance of a tennis match which Novak Djokovic played. So, since it is definable and chosen as a specific closed integral entity, let us analyze it (fig. 1).
Of course, this is not the only way to analyze Novak's shots. Instead of sides, one could use other parameters as a prime starting criterion of approach, such as ball height before contact, ball height after contact, ball spin, ball sidespin, ball-body distance at contact point, shots with good

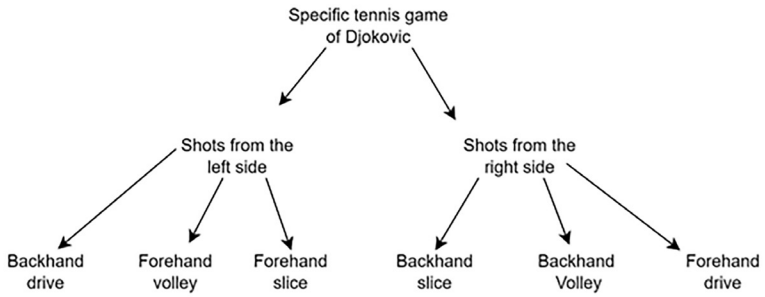

Fig. 1. An example of analysis.

/ bad accuracy, shots with high / medium / low velocity etc. It would be interesting to analyze Novak's game on such different criteria. This geometrical way, which we have conventionally selected in order to analyze Novak's shots is the one giving the most information in relation to the orientation of the body, which we have considered to be most important at the start. However, no matter in which way we analyze something, what we never change is the method of analysis: we start from one integrated "whole" entity and we proceed always from more complex towards less complex underlying and constituent partial combinations, *gradually*, until we reach the smallest fragment (by our convention). Now, all these "by convention" bits are very annoying to the westerner who understands the world through a language based on *modus indicativus*, literally by pointing at facts (vs. Greek "*definitivus*", essentially by applying definitions); but, as we have repeatedly argued, this is the only possibility. There is nothing "out there" that is "objective" which will do this job for us.

Many might object the idea that this is taken from experience, hence it is not definable as surveillance. We have already addressed this objection earlier in this paper by insisting that, no matter how addicted people are to perceiving the overused term "analysis" as a process happening almost automatically by which a model is extracted, quite the contrary surfaces as the case: it is an abstract, pre-existing template on which only *afterwards* can we decide to assign certain observational data; and that is a principal mainstream formal fashion in which we acquire what is definable as *a posteriori* surveillance. After all, *analysis* is a Greek word and its literal meaning is breaking up, dissolving.

2 Synthesis

So, in synthesis, one takes the analytical fragments and synthesizes them to form one (or more than one) *secondary synthetic entity* (fig 2).
As one may observe, there is no "Forehand slice". If there is a retrograde retracing of only the same fragments and all of them, leading to the same initial entity, then we have a very special case of synthesis called *resynthesis*. Here, "Game of X player" is the *secondary synthetic entity*. It is what most tennis learning systems try to do: create Franken-

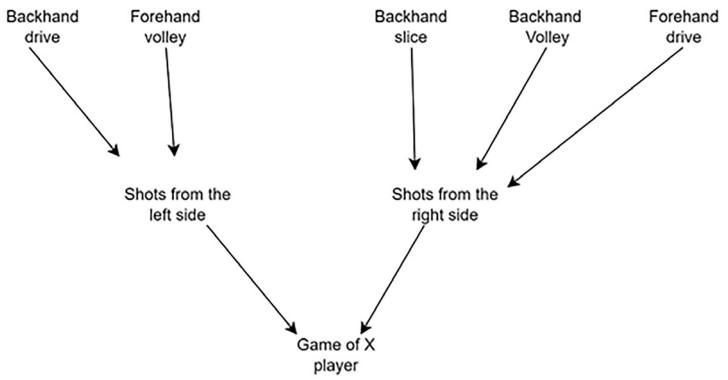

Fig. 2. An example of synthesis.

stein players whose shots are merely combinations of professional players' shots (filtered by the ideologies and the biases of the coaches – without even having any sound learning methodology in place).

3 Abstraction

What is the difference between analysis-synthesis and abstraction-structure? In other words, what is the difference between elements (analysis-synthesis) and (quality-defined) sets (abstraction-structure)? We have already seen what elements are: uniquely identifiable objects or processes. Sets are groupings of such elements based on some criteria. For example, we have the set of chairs[3] which has inside it all the chairs of the world. The issue is much, much more complex, but let us stick here with this *naïve* approach.

In our example here we have set out to explore a specific game played by Novak Djokovic. Almost automatically, then, we have a set; and that is the set which contains all the shots made by Novak. It might (or should) sound astonishing that the same entity, a specific game of tennis, can be viewed both as an element and as a set. Here lurks the gravest epistemological danger, that of consistency. In the axioms themselves, a set is treated in a completely different way in contrast to an element. So, if someone selects an entity as constituting an *element*, their only options are analysis and synthesis (and their variations, i.e., structural analysis and abstract analysis). If it is defined as a *unit set*, i.e., as a coordinated complete set comprising one sole element, also called a *singleton*, then nothing other than the abstraction-structure pair applies (as well as their variations, e.g., analytical structure and synthetic structure). All too often, individuals not disciplined in the theoretical epistemology's ways, skip back and forth between constituent elements and constituted sets, especially unit sets, confounding analysis-synthesis and abstraction-structure: the same way one should not treat sets as elements and *vice versa*, one cannot mix things up between one pair and the other; and, though analysis and abstraction are more easily distinguishable, synthesis and structure tend to be almost invariably confounded, though technically they run in opposite senses. All in all, one should never start treating something as an element and then, suddenly, because of a common starting point, decide in the process to deal with it as a set. One must keep these two things completely separated. A human body is a synthetic entity, whereas social groups are structural entities, that is, if we stick to this conventional depot of ours consistently; otherwise, we would have to set our boundaries in a different way and start our investigation anew. In another unrelated focal direction of abstraction, life is a structural entity. The tragedy in Frankenstein is that the insane scientist tries to synthesize life, which is impossible.

The set of all shots of Novak is our starting point now. Abstraction means that we start gradually generalizing by subtracting areas of specific narrowing properties, i.e., inclusion criteria (properties, according to Lekkas, *are* set-inclusion criteria). Again, it is for us to decide what. So, we start this process and our supersets grow bigger and wider and more diversified as the process unfolds, being subject to less criteria, they become less and less specific, ergo more and more general, hence including always more subsets and, indirectly, more elements. Let us try and make up a scenario, hopefully an interesting one, i.e., one leading to surprising results. In the following table 1, on the left there is the name of the set (which implies what is included) and on the right there is the symbol of subtraction, the minus sign "-", followed by what property we wish to take out, to remove. On the next line we take what we are left with (a bigger set!), and the process continues.[4]

3. {CHAIRS}

4. By convention, in set theory, inside the brackets "{}" designating a set, items written with small letters designate elements whereas capital letters designate criteria. For example, if I have three cats in my house, Luna, Lily, Bella there is a set with three cats symbolized as {Luna, Lily, Bella}, or, equally, {HOUSE CATS} (implying in the context it is written, *my* house and *my* cats).

1. {NOVAK'S GAME}	—Novak's style
2. {PROFESSIONAL TENNIS GAME}	—Professionalism
3. {TENNIS GAME}	—Tennis rules
4. {HUMAN GAME}	—Humanity
5. {GAME}	—Fun
6. {ANIMAL ACTIVITY}	—Being Animal
7. {ACTIVITY OF LIVING BEINGS}	—Life
8. {ENVIRONMENTAL ACTIVITY}	—Matter
9. {ENERGY}	—Energy
10. {UNIVERSE}	—Zero (nothing left to take out).

Table 1. Abstraction example.

Or start at 3 and take a different path (Table 2).

3. {TENNIS GAME}	—Serve
4. {POINTS WITHOUT SERVES}	—Measuring
5. {RALLIES}	—Backhand shots
6. {FOREHAND PRACTICE}	—Practice
7. {FOREHAND TECHNIQUE}	— (…)

Table 2. A variation of the abstraction example.

4 Structure[5]

Tao gives birth to One,
One gives birth to Two,
The Two gives birth to Three,
The Three gives birth to all universal things.

Tao Te Ching – Verse 42

Structure is contingent to the process of *creation* of subsets.[6] Full abstraction produces abstract archetypes, such as "1". What does 1 mean? Nothing, and this is why it can be *interpreted* as meaning anything (one cat, one galaxy). "One" has no properties and may by itself designate *U*, the universal set: a set that has everything in it that could be counted as "one 'something'".

For example, in regard to structure, if I take my three domestic pets, I take a set with three individual elements, Luna, Lily, Bella (or {Luna, Lily, Bella}). But everyone can see and tell me that these three animals are domestic cats. So, if I take away the criterion of "mine", I may have opened up and created a whole genus of domestic cats, whose Luna, Lily and Bella are members, (or {Luna, Lily, Bella}) is a subset). By detracting one more criterion, I could have widened the set into a zoological superset contingent on the wider (and less specific) "property" of being a "feline". Then I have designated and tagged a family containing 37 cat species that among others includes all cheetahs, pumas, jaguars, leopards, lions, lynxes, tigers, along with domestic cats. Thence I can go on and on taking out criteria and abstracting and widening, as felines plus some other classes constitute carnivores, which are mammals, which are vertebrates, which are animals, which are terrestrial living creatures and so on.

5. Unfortunately, in English and Latin, there is just one word for "structure" (*structura*) corresponding to four different terms in Greek language, i.e. *domē* (abstract archetype), *domēkē* (the plan of how to create something), *domēsē* (the process of creating; *structuring*), *domēma* (the final creation).

6. The first organized presentation of structure appeared in: "Definitional rectification of basic morphological concepts". Section 3.2.4, in D. Lekkas et al., *Arts II: Overview of Greek Music and Dance*, Vol. IV: Theory of Dance – Greek Dance Practice: Antiquity and Middle Ages, pp. 202 – 207. Greek Open University. Patras 2003. (Greek)

But if I move along the reverse course, that of *adding* specific criteria and *descending* in the opposite sense, piling up more and more extra specifying "*structural properties*", and narrowing down the reference subset, I can very well end up with a unit set that could be {Luna}, or {Lily}, or {Bella}. And that is the end of the way or the bottom of the well; I can no longer structure; all that I can do now is take one of my darling kitties (considering a 1-1 correspondence between, e.g., the unit set {Luna} and the element Luna) and start analyzing it, theoretically of course.

The potentially confusing thing here indeed is that the two directional senses of the dual methodologies perceptually go in opposite senses. Let us for instance take an individual entity viewed first as an element, i.e., as an *elementary* whole self-sustained, self-consistent and complete unity, in other words.

- Analysis is the gradual cumulative breakup of this entity into chosen always finer constituents (skin, skeleton, muscles, digestive system, nervous system, glands etc.).
- Synthesis is the gradual cumulative contributing construction of chosen constituents into individual concrete entities definable as complete integrated elements.

Thus, analysis is an inner breaking up and digging into elements deeper and deeper beyond their integrated existence, whereas synthesis is the opposite motion of concocting constituents and putting them together into getting whole elements; directionally, analysis is a theoretical or practical movement *away* from the single object, whereas synthesis is a theoretical or practical movement *towards* the element and thence, if we wish, jump over the boundary, including that single element into the singleton (which is of course a set).

On the contrary, perceiving the object as a single element of unit set, we can start fusing sets into always wider supersets, where the criterion of inclusion is a perceived property used as a test:

- abstraction is the gradual application of detracting[7] specific criteria or properties of inclusion in sets, thus making the inclusion quota always less focused and therefore more tolerant or looser, resulting in the participation into ever wider supersets;
- structure is the gradual cumulative contributing addition of further constricting properties, thus multiplying and tightening the quota for participation, and thence resulting in the stricter participation in ever narrower subsets, in a course effectively terminating in unit sets (singletons), each comprising one single element.

All this taken into consideration:

- analysis is a movement away from the element into its constituents, and, as such, it moves along a course opposite to that of leaving the element towards multitudes of elementary unit-sets; figuratively, they both move away from the issue in question, but one goes down inside, whereas the other moves up and over "towards the sky"; thus, analysis and abstraction do travel in opposite senses;
- synthesis is a movement towards the element away from its constituents, and, as such, it moves along a course opposite to that of leaving the generalized supersets towards smaller subsets terminating in unit-sets; figuratively, they both move towards the issue in question, but one goes up from within, whereas the other moves down "towards the item" from above; thus, synthesis and structure travel in opposite senses.

Similarly, one can create any subset imaginable by enumerating enough properties. What type of fruit has the properties "sweet, red, crunchy"? Apples, i.e., the set of apples. Which fruit has the properties "sweet, red, crunchy, on my table"? A unit set with its single element that corresponds 1-1 to a specific apple. Which player has the properties of "professional, Serbian, GOAT"[8]? Djokovic. However easy it is to jump from one single property to a

7. This is why both abstraction and subtraction bear the same name in Greek: ἀφαίρεσις.
8. Greatest Of All Times.

unit-set (who has the property of being the author of *Odyssey*? Homer!), a unit set is not an element but a set containing that one element – which is something totally different theoretically –, and the end of structure is not automatically the beginning of analysis. Usually, however, in order to end up with a unit set we need a lot of properties, a lot of specializing criteria, so to speak. This is much more apparent, e.g., in tennis training. It is wishful thinking to have the expectation that the property "the best exercise to become a good player" leads to a unit set. Hence the need for the creation of a much more complete system, equipped with models, theory, working hypotheses and conventions (in other words equipped with *context*), so that, at worst, a well-defined subset may include elements of value for our case. I say "at worst" because a well-structured subset which is out-of-context may include incredibly irrelevant contents. For example, within the tennis Distal Method context, the properties of "having transition-work, being from the baseline, using motowords, using targets" lead to a subset with a limited number of specific drills; and those could further be structured using even more properties until we get a unit set with one drill (which, when I actually do it, will become an element). In Islamic context, however, this one drill coming from the same properties could be "Pray to Allah": the perfect drill to become good at anything in a theocracy is by praying.

A simple way of structuring a set so as to include all the shots of tennis would be to use geometric properties and only afterwards to develop the elements meant to belong in this structured set. So, there would be a set containing "types of shot executed from –", and where the dash is one could fill in locations, such as "left, right, high, low, front, back," etc.

The dual-paired method of epistēmē in practice

We have tried to see some examples from all four types of procedures, i.e., analysis-synthesis and abstraction-structure. An important consideration that might be somewhat obvious until now is that none of these four actually work in reality. This might sound surprising, but here is the explanation: all four procedures are abstract; and in the real world we need criteria. Hence, while it is important to be clear about those four basic procedures, in reality someone is going to analyze, for instance, something not in a vague-arbitrary way but based on either abstract or structural criteria. When we did analysis regarding Novak's shots, it was actually a structural analysis since the terms "right", "left" are structural. In reality, then, there will typically be either abstract analysis or structural analysis. The same applies to all the three other basic procedures; i.e., in applications there will only be the combinations discussed earlier:

1. *structural analysis*,
2. *abstractive analysis*,
3. *structural synthesis*,
4. *abstractive synthesis*,
5. *analytical structure*,
6. *synthetic structure*,
7. *analytical abstraction*,
8. *synthetic abstraction*.

What types of analysis do we have? Abstract analysis and structural analysis. Full abstraction is mathematics and full structure leads to a unit set – and here we may never be too careful: never make the mistake of confusing a unit set with an element; For example, Rafael Nadal is an element that corresponds to a unit set with next to infinite properties (from eye-colour to Bone Mineral Density). Let us take ten properties out of the specific billions of properties that describe the unit set which, out of the infinite elements of the universe, may include only one: that of Nadal.

1. Human
2. Plays tennis
3. Male
4. From Mallorca
5. Left-handed
6. Black hair
7. Grand-Slam winner
8. Tall
9. Spanish-speaking
10. Is a millionaire
11. …

It goes without saying that many properties are impermanent (at some point he didn't play tennis, at

some point he won't play tennis anymore, at some point he wasn't a millionaire etc.). In epistēmē there are no "objective facts", only conventions. We set the criteria conventionally. If we expected the phenomena to dictate the criteria, epistēmē would be impossible.

The same way, abstract and structural entities, are such, i.e., abstract / structural, only in relation to each other. {DOGS} can be either seen as a structural subset stemming from the more abstract superset of {ANIMALS} or as an abstract superset coming from the more structured subset {BULLDOGS}. Full abstraction and full structure are idealizations; most things we use are somewhere in between. So, for example, if I have a continuous course from a unit set describing my dog {JACK} to the mathematical archetype of one, there are almost infinite intermediate sets. For example (a selection):

{JACK} ⊆ {DOGS I OWN} ⊆ {DOGS MY FAMILY OWNS} ⊆ {DOGS MY FAMILY HAS OWNED} ⊆ {ALL DOGS} ⊆ {CANINES} ⊆ {MAMMALS} ⊆ {ANIMALS} ⊆ {LIVING BEINGS} ⊆ {ALL BEINGS} ⊆ {BEINGS AND THINGS} ⊆ {THE UNIVERSE} ⊆ {ONE}

So, here, of course {JACK} is structural and {ONE} is abstract, but what about {ANIMALS}? {ANIMALS} is (more) structural in relation to {ALL BEINGS} and (more) abstract in relation to {CANINES}. Again, one may just select what is what by convention, as long as what is produced is consistent, productive, elegant. This is the way we are going to use the various criteria in the case of this tennis match as well. So, off we go:

- Abstract criteria: when I want to idealize. For example, when I want to create categories, such as locomotion, manipulation, ballistic, stance (motor categories).
- Structural criteria: when I want to describe more specifically. For example, a drill that satisfies the properties of fast, right and left sides, offensive.

Let us see another example. We have a game of tennis. A game of tennis can be either an element or a unit set *according to the focus of the approach*: if we choose to investigate its parts, then we have treated it as an (analyzable) element of a set. On the other hand, if we decide to delve into its properties by including it in supersets (in sets such as: {GAMES OF TENNIS}, {SPORTS GAMES}), then we are doing abstraction treating the said game of tennis as a unit set; one should be careful enough to create sets that have more or less similar elements which can be, more or less, interchangeable. A set of tennis shots cannot include things such as balls and tennis shoes. The latter is more of a rule of thumb, rather than a formal rule; however, it helps with the understanding of the processes discussed here. Now, let is turn our focus to the difference between structural and abstract analysis (or synthesis); and between analytical and synthetic abstraction (or structure).

Let us start by supposing that we have these three sets: {OFFENSIVE SHOTS}, {DEFENSIVE SHOTS}, {BLUFFS}. Since the labels of the sets are properties, that is, inclusion criteria, we could use such a property to, e.g., make a series of shots that are offensive (first serve, forehand winner, backhand volley). This latter process is synthesis; however, is it *structural* or *abstractive* synthesis? That is, is it synthesis based on abstractive criteria or is it synthesis based on structural criteria? It is all a matter of point of departure. We have already seen the difference between structure and abstraction in theory. A property may be called abstractive or structural according to the path which we have followed in order to reach it. For example, we have the property of "redness". Is it a structural or an abstract one? If it has been the result of abstraction, then it is abstract (for example, if {RED} has resulted from the set of {RED ANTS} by eliminating the property of "being an ant"). On the other hand, if one structures the (super)set of {COLOURS} contingent on {SUBJECTIVE VISUAL COLOUR STIMULI} extended to {FREQUENCY BELTS OF VISIBLE LIGHT} as a subset or the even broader superset of {ELECTROMAGNETIC WAVES}, then the resulting (same) set {RED} would be treated as a structural one. Depending on the origin of the property, the subsequent process of synthesis (or analysis for that matter) will be called either "structural" or "abstract". The exact same idea applies to characterizing an element as analytic or synthetic, depending on the point of de-

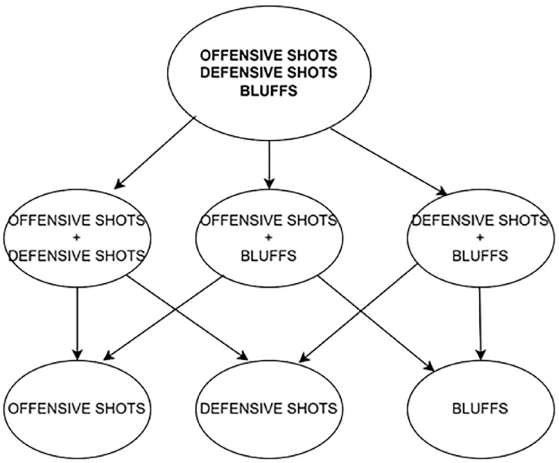

Fig. 4. An example of structural analysis.

parture. A persisting question might be: since the set, or the element, is the same regardless of the process that we have followed to arrive at it, what is the difference? What is the practical significance of such a distinction? In other words, what is the difference between calling something abstract vs. calling it structural (or synthetic vs. calling it analytic) when in the end it is the same thing?

The route which we followed to arrive at our entity results in an enormous difference, having even ethical consequences. On one hand, it would be quite messy and deceitful to confuse these two separate pairs of processes: a top-down process to create a set by describing what we would want a set to be like[9] (structure) with a bottom-up process to create a superset by eliminating content and properties from a subset (abstraction); a process of splitting things (analysis) with a process of combining things (synthesis). Such processes directly affect the end-product even if in theory there is no difference: for example, in theory, an element is identical to a resynthesized element. If I have a car (an element), break it down to its parts and then reconstruct the initial car from these parts, these two cars are identical. But what if I have a human being, I separate this human being's parts and try to put them back together? Is this latter case of resynthesis going to give me my initial human being, or Frankenstein's monster? Or consider how different it would be, both technologically and ethically, to take a heart out of a dead body (analysis) from synthesizing a heart *in vitro* from cells; both processes end up giving us a heart though. In epistēmē (and science) we should never evaluate the end-result, but always the (necessary) cause, the process it led to whatever result. The result can be accidental, similar to our plans or completely different; it makes no difference (and that may be called the *strong doctrine of evaluation*).

Now, all criteria should also be well defined. For example, what does "offensive" mean? Something which we merely feel to be such? No, in a mechanistic approach it should be correlated with various measurable parameters. So, for example, one could define "offensive shots" as any shots that are quicker than the shots that they respond to. Another consideration that, oftentimes, something could be categorized as both offensive and defensive (e.g., a tennis shot). What happens then? In analysis, every shot is an element, a uniquely identifiable one, that happens in a given time and space. So, we just follow the definitions and we record shots based on the definitions. If for example a shot is both offensive and a bluff, then it should go to the appropriate category of {OFFENSIVE}.AND.{BLUFFS}. This is why we should actually create categories with all possible combinations, starting from the most complex towards the simplest ones. In that case, we should have a somewhat more detailed model (fig. 4).

9. Another way to understand structure is as a way to create something based on *specifications*. For example, we wish to have a house that is airy, sunny, modern, ecological and small. All these are properties that create a set of similar-looking houses.

Surveillant reality

In everyday life, we infer how things are based on what we perceive from our senses. In epistēmē, in surveillant reality, we infer how reality should be based on arranging things in our heads, and only afterwards do we go to the world and try to find a way to fit the observations to this inner narrative. If that inner narrative is made based on wishful thinking and/or lack of a complete method, such as the dual-paired method of epistēmē, then our effort to find where our narrative applies is nothing more than cherry picking (or *suppressing evidence*). If one tries to merely record experience and rename this recording as "surveillance", attempting to apply it in other cases, then that would be an over-generalization; a flat narrative without special cases, forbidding principles, exceptions and limits – all the stuff that one would expect to get from a good application of the dual-paired method of epistēmē.

Of course, we people do both simultaneously: part surveillance and part experience. Simultaneously, indiscriminately and mixed up, not knowing what is what and when to generalize and when not to. In epistēmē, one ought to keep the two realities apart; only at the very end is one to compare and contrast these two realities, the surveillant reality and the experiential reality, and even make a timely jump from one to the other, taking all necessary precautions.

As a sidenote for expertise, all these theoretical considerations, i.e., how to make theory (via surveillance), are the subject of theorists / scientists (didactics); the application of theory to practice is the responsibility of coaches and trainers (teaching).

It is not only tennis trainers who utterly disregard this abyssal difference between experience and surveillance and talk about their own and others' experiences as if they were surveillance; scientists and great researchers also do the same especially when abusing statistics. Statistics is not the basic method of epistēmē; just by computing the likelihood of something, one has not gained focused individual surveillance, but rather one has achieved to make even better sense of their experience in a predicate-bound sense. And it does not work in the para-deterministic or quasi-deterministic realm of basic "0-level" Propositional (or Statement) Calculus, being an essential field of application for generalizing and specializing Logics of "non-zero" levels – starting from "level-1", known as Predicate Calculus. The obsessed identification of statistical output to surveillance is the fruit of statistical positivism: the zombie alter-ego of logical positivism that has collapsed after Quine's classic paper (arguably, for the wrong reasons in terms of significance, but still [9]).

As a conclusion, while the subject of this paper was the method of epistēmē and how this leads to surveillant reality, the moral of this presentation is that everyone, from tennis coaches up to Nobel prize winners, all should have at least a general surveillance of the dual-paired method of epistēmē, as well as of concepts such as surveillance, reality, truth and theory.

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