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Umwelt-measures. On extensive and intensive measures: Introduction to the special issue 'Theorising measures, rankings and metrics'

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Abstract

In modern science, we usually associate value with a numerical determination – such as, for instance, the value of the Planck constant. However, once we examine value as a co-original facet of measure, we are led to distinguish – with Spinoza – what we could call the *natura naturans* of measure from what we understand by measurement as its *natura naturata*. First, I discuss the tensions and the connections between the extensive side of measures (*molis*, magnitude) and their intensive side (*virtus*, worth) to provide a preliminary map for plotting the relations between measures and the social–moral–technical environments where they are performed. The second part of the text presents the articles in this special issue, highlighting how they tackle the social ecology of measures drawing from distinct theoretical lineages.

Keywords

extensive/intensive measurement, magnitude/worth, measures-as-monsters, value–measure environments, unit of measure

Résumé

Le regard scientifique moderne tend à associer la notion de 'grandeur' à une détermination numérique – telle que, par exemple, 'la grandeur de la constante de Planck'. Néanmoins, à partir du moment où nous concevons la valeur comme l'une des facettes originelles de la mesure, nous sommes amenés à distinguer – avec Spinoza – ce que nous pouvons

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appeler la *natura naturans* de la mesure de sa *natura naturata*. J'aborde tout d'abord les tensions et connections existant entre le côté extensif des mesures (*molis*, grandeur) et leur côté intensif (*virtus*, valeur) afin de donner une cartographie préliminaire nécessaire pour tracer les relations entre les mesures et les environnements sociaux–moraux– techniques où ces dernières sont produites. La deuxième partie du texte présente les articles de ce numéro spécial, soulignant comment chacun aborde l'écologie sociale des mesures à partir de lignées théoriques distinctes.

Mots-clés
environnements de valeur-mesure, grandeur/valeur, mesure extensive/intensive, mesures comme des monstres, unité de mesure

Magnitude and worth

At the end of the 13th century, the German Dominican friar Dietrich von Freiberg composed a *Tractatus de mensuris*, where he interestingly tried to reconcile the Aristotelian conception of time with the newer conception exposed by Saint Augustine (Von Freiberg, 2017). The first chapter of von Freiberg's treatise, titled 'Ratio mensurae durationis in generali' [The general ratio of the measure of duration], contains the following important definition of measure:

> Importat autem mensura determinationem rei quantum ad aliquem essendi modum secundum quod in ipso modo essendi quantum ad modum significandi importatur aliqua ratio seu proprietas quantitatis, molis videlicet vel virtutis, ut in nomine virtutis intelligatur quantitas intensive secundum qualitatem, molis autem quantitas extensive sive in continuis sive in discretis.

> [A measure establishes a determination of the thing with reference to its mode of being, insofar as in this same mode of being, with respect to its signifying mode, a ratio is established, or a property of quantity – which is either of magnitude or of worth, where by worth an intensive quantity according to quality is understood, and by magnitude an extensive quantity either in continuous or discrete things.]

Notably, in this somewhat difficult text, a *relational* definition of measure is laid out: a measure is conceived of as a *ratio*, a correlation between a 'mode of being' and a 'mode of signifying'. For the medieval scholar, the task of establishing such special relations which we call 'measures' is double: on the one hand, a measure ought to provide a ratio of magnitude [*molis*], on the other, it ought to provide a ratio of worth [*virtus*].

Here, we can appreciate the inception of a distinction that would eventually become quite familiar to social scientists, namely, the distinction between quantity and quality. What is most revealing in von Freiberg's conceptualisation, however, is that, for him, measures should be able to capture *both* aspects. In the modern period, by contrast, measures have been increasingly relegated to dealing only with extensive-quantitative aspects of existence, to the point that the notion of 'qualitative measure'

seems to have become an oxymoronic expression to be thoroughly discarded by the natural science.

In a nutshell, it is perhaps possible to say that, in the modern study of nature, the development of formal and mathematical models has favoured the quantitative Newtonian epistemology over an alternative qualitative episteme which could have been elaborated by drawing from the contributions of Leibniz and Goethe. The apotheosis of the former programme is, in any case, encapsulated in the famous dictum by the early-20th-century physicist Ernest Rutherford, 'the qualitative is nothing but poor quantitative'. However, the notion of qualitative science has not completely disappeared. In the second half of the 20th century, notable theorists such as, among others, Adolf Portmann in zoology, René Thom in mathematics, Robert Rosen in biology and Oliver Sacks in neurology, appear to have vindicated it to some extent. Not paradoxically, it may even be the case that, in the early 21st century a new moment for qualitative science and qualitative measures could open up. This fact is certainly related to the digital technologies that have made quantification an increasingly easy, almost automatic task.[1]

Certainly, von Freiberg did not claim that both aspects – the qualitative and the quantitative – could be conveyed *at once*, or within a single grasp, but he nonetheless held that a measure can determine a measured thing in two fundamentally distinct ways. With the development of modern science over the last few centuries, magnitude has become so powerful and self-evident a notion that we have in many cases simply lost sight of the crucial, intimate link between measure and worth.[2] If the notion of *worth* or, as we may also call it, *intensity*, remains irreducible to quantity, this is probably due to its connection to the general anthropological phenomenon of *value*.

How could a non-formalised notion of value be envisaged in connection to measure? Measures were invented because something was deemed to be valuable, as is perhaps most visible whenever the *moral–political* face of measures is cast into light – including for instance issues of justice, fairness, competition and reward.[3] Measures are, and always have been, devised as technical tools to *capture* an essentially axiological value. It is precisely how such an act of capture comes about that needs to be more fully explained by a sociology of measures. In fact, in this capture lies the powerful possibility of either separating or connecting the two sides of the coin, represented by, as seen above, quantity and quality, magnitude and worth, *molis* and *virtus*.

Value and Umwelt

What the above excursus into the pre-modern notion of measure suggests is that value lies at the core of measure, yet not simply as a *product* of measurement. In modern science, one is immediately led to associate value with a numerical determination – such as for instance, the value of the Planck constant. However, once we examine value as a co-original facet of measure, we are led to distinguish – with Spinoza – what we could call value as the *natura naturans* of measure, from what we understand by measurement as its *natura naturata*. We could perhaps endorse the following formulation: *measure valorises* (it visibilises value, it gives back a quantitative, comparative indication for the phenomenon at hand), but *value circumvents* or eludes measurement (it can never be reduced to the numerical quantification attached to a measured thing). Using Thom's

(1988) terminology, such separation corresponds to that between the 'pregnantial' and the 'salient' aspects of value. While salience pertains to the domain of established forms, 'pregnance' aliments the domain of informal forces. Pregnance is communicated throughout various saliences, travelling 'contagiously' from one salience to another.

This distinction may help explain why measure systems never work completely as they are expected to work – i.e., they do not work as if they were purely salient entities, simple diagrams, rulers or grids to be applied to inert matters. The predicament in all measure systems and all measurement apparatuses can thus be traced back to the epistemological disappearance, or invisibilisation, of *virtus* from modern measure. Such disappearance has left *molis* as the only legitimate, visible reference. Certainly, theoretical alternatives to this situation have been advanced. In the social science, for instance, the theory of Boltanski and Thévenot (1991) has made an effort to rescue a conception of *virtus* in the context of the social practices of justification. Boltanski and Thévenot employ the term *grandeur* to address what we may characterise as an intensive principle of valorisation whose quantification is always problematic and, so to speak, always 'to come'.

The 'test' is precisely for Boltanski and Thévenot the momentous situation when the pregnantial tension of valorisation is crushed into a legible quantification – the test is always a test of strength, even though its preparation can be quite subtle. The English translator has, in this sense, correctly rendered the term *grandeur* as *worth*, rather than as magnitude or other related words. Indeed, for the French theorists the central problem in producing an acceptable justification lies in convincingly connecting the stance at hand to some available principles that can lend worthiness to it. In this sense, before Boltanski, Chaïm Perelman had already produced a fundamental analysis of argumentation that went in this same direction (Perelman & Olbrechts-Tyteca, 1958). In fact, Perelman presented rhetoric as an arsenal of mobilising argumentative strategies whereby adherence to a given thesis can be gained or increased. Such psychological adherence, which we may think to be *a fortiori* measurable, is attained by aligning the given case to an invisible-but-present value, capable of precipitating or shifting the magnitude of consent. Value, which Perelman characterises in terms of a series of tropes, features in his model as a kind of mathematical 'attractor' of psychic adherence.

If value can be said to exist in measure *two times*, or with two faces, it becomes possible to reason in terms of 'value–measure *circuits*', or dynamic value–measure complexes. The two poles of the complex, respectively value and measurement, constantly nourish – or, alternatively, hamper – each other's attainments. They exist in a state of 'entanglement'. Value is certainly visibilised by measurement, in the same way in which flags are wind made visible; but just as flags do not exhaust the wind rushing through them, value is never fully tamed by any measuring apparatus or any actualised measurement. The practically 'restless' nature of all measures corresponds to the persistence of an invisible value living or residing *in* them: no matter how well specified are technical protocols and measurement standards, every concrete measurement always remains exposed to open questions, such as: Is this the right way to measure? Is this the right way to employ this specific measure? Are these really the phenomena that were supposed to be captured by this measure? Is this measure actually meaningful to convey the value we are interested in? Is comparing the measure of this phenomenon to the measure of that

phenomenon really enough to compare the two phenomena? Value as pregnance, or informal correlate to each form, confers a dynamic character to every measure system, which accelerates the coming into existence of the latter, but also facilitates its transformations, its reformations as well as, ultimately, its demise. Value is, so to speak, the factor that breaks time symmetry, and destines measures to always head towards a future of change.

In a previous contribution, I have suggested that measures may be conceived of as not simply tools in our hands, but precisely as *environments* in which we live (Brighenti, 2018). As a further step, it is perhaps possible to imagine that measures are special spaces where the coupling of a given living being with its meaningful environment can be fruitfully accomplished. Which sort of spaces? The notion of *Umwelt* can be foregrounded here. Following von Uexküll (2010[1934]), the *Umwelt*, or 'surrounding environment', is an inherently spatial-relational undertaking: what matters for its definition is neither the physical set-up of the place nor the psychological state of the organism, but precisely the whole system of connecting relations that comes to be locally established *at the interface* between them. Incidentally, this insight resonates with the philosophy of individuation proposed by Gilbert Simondon (2013[1964–89]), where the individual and the ambient are seen as two sides of the same operation of individuation. For Simondon, individuation and environmentalisation can thus be said to be like the two slopes of a roof, deriving from and remaining connected to a single ridge.

To study measures as types of *Umwelt en*, or individuations–environmentalisations, allows us to better tackle their praxeological and temporal dimensions. In turn, these dimensions are important to explain why measures never work as their theoretical diagram indicates. The importance of the *unit* of measure, the unitary element of measure, has been previously remarked (Brighenti, 2018). It is now possible to see why, in turn, this is connected to von Freiberg's reference to *virtus*. The unit of measure – the case in which n = 1 – is not just a quantitative occurrence among the others, but also entails the qualitative colouration that provides the veritable *signature*, the *Stimmung* of a measure environment. The unit summarises or encapsulates an environment, and cannot be understood without it.

Power and time

Every unit of measure only exists within an ecology of connections: the unit is an ecological operation. We are dealing here with an active, or living ecology where the extensive, connective-organisational existence is always coupled with and supplemented by an intensive, mobile-pregnantial existence. The *Umwelt* dimension of value–measure complexes thus introduces a new perspective and raises a new set of questions. In particular, a shift occurs from the classic, ontic-ontological (maybe better, epistemological) question 'What is a unit', to the entwined praxeological (experimental) questions: 'What *can* a unit?' and: '*When* is a unit?'.

Because measures can be as crafted and diffused just as much as they can be resisted, twisted, or even plainly ignored (as illustrated for instance by Christopher Dorn's article on hospital rankings in this issue), the sheer epistemology of measures never exhausts their praxeology. Put differently, the epistemological must be treated as a concrete

empirical reality. The irreducibility of usage to grammar confirms that the domain of practice is larger than the domain of design. For his part, Ken Alder (2002) has finely captured this tension as one that exists between, on the one hand, the dream of installing an a-historical formal system and, on the other, the never-ending contingency of history and historical unfolding:

> Each new measure is introduced to repair old mistakes. But, its implementation creates a Babel and generates utter confusion, at least in the transitional period. Proponents of new measures, however, argue that confusion is a minor evil, a collateral damage until the new system will be the only one. But history reveals that all periods are transitional. A hidden defect is always present in each new measure that will be sooner or later discovered. This is not simply a technical or technological issue. Rather, the point is the value that should be measured that changes. What drives a measure's existence? What is its raison d'être?

Here, the problem of time intertwines deeply with the coming about of a new unit of measure. As we know, the late 18th-century Meridian expedition sought to establish the length of the geodesic metre, and implement the metric system accordingly. It was, in this sense, an undertaking that sought to 'repair old mistakes'. An enlightened science – initially sponsored by the king, and subsequently by the republican state – was put at work to invent an alternative system to the old one of local, fluctuating measures, now judged as unreliable and mistake-prone.

But while the *raison d'être* of the metric system was squarely grounded in a what-is-a-unit attitude, the very process of its creation (the seven-year expedition, with its innumerable difficulties, the international scientific conference of 1798, the prototype of 1799, up until the Metre Convention of 1875, until its subsequent 20th-century redefinitions based on light waves) turned out to be riddled with what-can-a-unit and when-is-a-unit problems. Lacking completeness and being caught in a process of almost impossible completion, measures are perhaps necessarily *monstrous things*, in a very Lovecraftian sense – outlandish, half-formed mongrel beings emerging from a swamp which constantly sucks them back in. In fact: What is a monster, if not an out-of-measure? Until the measure is set, monsters inhabit the earth – and, if measure can never be fully set, monsters can never be completely banished.

Even if the metre was eventually established by the late 18th century Meridian expedition, that happened at the expense of the psychological health of the leading scientist of the expedition, at the expense of some infamous data fudging, and most importantly on the ground of a wrong assumption about the actual shape of the Earth (besides the accidental occurrences of revolts, wars, revolution, and hyperinflation which plagued the two groups of geographers). The measure could also be established only because a stern centralist state administration was in the end able to impose it forcefully onto its population, and because France was able to orchestrate a grand politics of prestige so that the invention should be adopted as an *international* standard (despite the fact that measurements had been performed mostly in France, plus in a little bit of Spain) – and so on for a number of other flanking measures to the metre itself (measures of weight, time, etc.).

Turning to praxeology, the 'When is a unit?' question means: How long can a unit of measure last before it is transfused into a different unit, forming a different constellation

and thus ultimately evoking a different measure? As said, the unit is the signature case of a multiplicity, a condensed ensemble of the elements in a constellation, capable of endowing them with some sort of gravitational field. A twin question follows: What sort of rhythm, which scale of human association does a certain measure enforce, encourage, or afford? It has been pointed out that measures often suffer from considerable 'inertia' (Merry, 2016). Apparently, more energy is needed to change them than to keep them as they are: data tend to circulate, they tend to be used and re-used until and unless they have quite visibly become too 'old and outworn'. Yet, at the same time, it seems as though measures are most of the time in the process of morphing into other formations. Historical epochs could indeed be defined in terms of the changes in the measures that most matter to them. For instance, haven't a number of crucial social measures already changed over the last 20 years?

The conservative and the transformative forces that jointly define the environment of each measure–value complex inhere in the *molis–virtus* entanglement. As Leibniz saw well, the world of magnitudes allows for a *cogitatio caeca*, an intuition-less sign-processing: at this level, measures are supposed to work automatically, and they would only be subject to inertial forces. But, the world of worth is like a flame burning inside every formal system: it consumes the structure, acting as a relentless sea wind that twists the form of the local vegetation. Even besides cheating and gaming, or alongside them, the logistic working of measures is thus confronted with the currents of dissatisfaction that *virtus* animates. The presence of intensity explains not only why – as first noticed by Witold Kula (2014[1970]) – the history of measures coincides with the history of cheating, but also and especially why the psychological experience and psychic stance towards measures are hardly ever neutral, always bordering as they do on concern, preoccupation, anxiety and obsession, but also, on the other side, on enjoyment, reassurance, celebration and euphoria.

This special issue

Far from exhausting the variety of phenomena inherent in the social study of measures, the articles collected in this special issue have nonetheless the merit of highlighting some of the most intriguing theoretical approaches devised in current studies of measures. Rather than attempting to unify such a multiplicity, it is possible here to introduce the articles and appraise their approach. It is hoped that this attempt may give way to further opportunities for exchange across theories, disciplines and substantive topics of interest.

In the opening piece, 'Ethical Dimensions of Quantification', Wendy Espeland and Vincent Yung use a cultural sociology approach to examine three different but not thoroughly unrelated cases, namely the spread of academic rankings, the US ethnic census categories, and the effects of facial recognition algorithms. The authors issue a global invitation to 'look behind the numbers to see the assumptions and biases they contain'. In the tradition of the modern social science, numbers are usually associated with objectivity and rationality (as, for instance, *per* Simmel's classic analysis of money); however, the authors argue that, to the extent that social action comes to be based upon and coordinated through numbers, the latter also affect 'who and how people can participate in

decisions'. In other words, numbers are practically used to not only inform, but also promote, attract, discourage, and even punish.

Measures are interwoven with a politics of visibility, the politics of visibilisation and invisibilisation that is attached to them. They selectively drive attention and naturalise public perception. This fact reverberates in the issue of who creates measures for whom, and who is to be subjected to which measures. In the case of university rankings, the authors note that, at least initially, rankings were proposed by third parties, while universities tended for a while to ignore them. Since the early 2000s, however, an attitude towards student recruitment as customer stock increase became dominant. At that point – and more clearly since the creation of global university ranks – ranking tools became interiorised and self-propelling. Universities started to struggle to get better positions – a huge investment into a single measure (the rank) that can easily create general frustration and induce gaming, especially when participants realise that they are taken in a measure–value environment based on relative positioning. With new players entering the race, each is required to do increasingly more work just to retain its previous position.

The second case study concerns the creation of the 'Asian American' category as a pan-ethnic definition for census purposes. It is a clear example of how administrative categories are constructed by the state, with the effect of enhancing the visibility of certain phenomena to the detriment of others. The political aspect of the census is again significantly tied to the politics of visibility that can be played out through it. Indeed, every definition of a population group *visibilises* certain traits and *invisibilises* others. Generally speaking, a newly formed category will emphasise unity of the group, de-emphasing inner cleavages and inequalities. Grouping people under a new tag alters the number of potentially similar or comparable groups. Because of this, advocacy groups and social movements have historically oscillated between, on the one hand, criticising the census system categories and, on the other, exploiting them to gain concrete advantages for issues in their own agenda.

The case of algorithms – the third case study in Espeland and Yung's piece – seems to confirm the trend towards quantification and automation in several domains of everyday life. Face recognition is in particular one field where stakes are high, given that the face is the scion of individual identification (Brighenti, 2008, forthcoming). Face recognition is also currently one of the largest developing markets in the field of artificial intelligence – suffice to recall that, during modernity, the body has always represented one of the objects most intensely subjected to measurements (Brighenti, 2018: 36–37). Again the authors argue that, while we are presented with a master narrative of objectivity, in fact we know that most of these software programmes are racially skewed (for instance, they return a disproportionate number of misidentifications for African-American and Latino groups), opening up an uncharted territory for racial discrimination and abuse.

The second article featured in the special issue, by Nina Pohler, focuses on a different situation where measures take on immediate moral-political import. Pohler presents research she has conducted on wages in two worker cooperatives (one in Germany and one in the UK) grounded in ethical foundations. Far from being simple compensation for work, personal remuneration is always embedded within a network of meaningful social relations. What is peculiar about the organisations observed by Pohler is that they work on the principle that remuneration has to be agreed upon and determined consensually by

the workers themselves. Here, moral and political considerations intertwine with technical issues: the commitment to fair pay creates the problem of how to determine the right wage on the basis of the needs of the worker as well as his/her contribution to the cooperative in terms of skills.

The theoretical approach adopted by Pohler combines Boltanski and Thévenot's sociology of critical capacities and Callon and Muniesa's model of calculation, considering in particular various critical strategies that can hamper the deployment of calculation. Pohler highlights two constraints that affect wage decisions: on the one hand, a decision must be supported by some arguments (principle of justification); on the other hand, divergences in justification repertoires must be tamed (there is a threat of incompatibility between the employed principles of valorisation). The outcome is often a pragmatic compromise between mutually irreducible principles. Compromise is, in fact, an unprincipled agreement. In the first organisation, for instance, equal pay was the original model; subsequently, following someone's discontent, a base salary was established, along with weighted factors that could be applied to the former to adjust it to personal needs. In practice, however, because no agreement was eventually reached on the latter, the pay reform did not materialise.

In the second organisation, differences were already ingrained from the outset, but payment differentials were limited within a 3:1 span. In this case, tension was created by the difference between the principle of competence (personal know-how and skills of the worker) and the principle of market added-value (the capacity to generate revenue for the firm). Some people may be more qualified, but others may produce more business. Furthermore, quantifying competencies may leave scope for additional discretion, as there can be ambiguity of application. Pohler records a lot of hesitation and ambivalence on the part of workers to publicly reclaim an increase in their salary, or a revision of allocation rules. An open discussion of competencies may bring to light mismatches between one's own self-perception and the perception of fellow co-workers, as well as undermine the group's solidarity as a whole, which is the *raison d'être* of the cooperative format. Too many aspects of the work are deemed by the workers as 'really hard to measure'. Thus, the limits to measurability are constantly looming over discussions of wages.

Pohler's case study illuminates a more general phenomenon concerning measures: the fact that they are multi-faceted creatures. Measures are always evoked in the context of a certain aspiration to justice, and involve a conversation about what can and should be measured as against what cannot and should not be measured (moral–judiciary facet). But this conversation eventually needs to be made explicit, agreed upon, and implemented (political–administrative facet) to be subsequently technologically crafted (technological–scientific facet) (see Brighenti, 2018: 29). Also, these steps effectively form a cycle (or, better, a spiral), so that it is impossible to determine which comes first. As widely experienced, such multiplicity and the overlaps that come with it easily generate discontent.

This may be one of the reasons for the deliberate production of indeterminacy inside value–measure circuits. The phenomenon is documented by Felicitas Hesselmann and Cornelia Schendzielorz in their piece. Examining the evaluation of scientific publications, Hesselmann and Schendzielorz reconstruct the context and meaning of indices such as the so-called 'impact factor' created by Eugene Garfield in the 1950s. Their

theoretical approach is informed by, on the one hand, Peirce-inspired social semiotics and, on the other, Bourdieu's theory of symbolic capital; Dewey's pragmatism, as mediated by ethnomethodology, is also part of the reference framework. The authors emphasise that the connection between measures and values is not merely representational, but rather performative: 'value–measurement linkages [form] a dynamic relationship in which (symbolic) struggles are conducted in the medium of language'. For this reason, the connection remains highly dynamic in praxeological terms.

Just as Espeland and Yung, Hesselmann and Schendzielorz too underline the political significance of the measures of academic performance. In particular, they suggest that there is an intrinsic pervasiveness of measures, whereby current measures appear to automatically spur the deployment of further measures. Consequently, rather than being pinned down by an act of measurement, values are rather mobilised and put into 'constant flux': 'The multiplication of measurements and their uses in subsequent evaluations – the authors conclude – breeds considerable value diffusion: by blurring their designation these processes ceaselessly re-create, transform and modify values'.

In the case of academic journal evaluation, more particularly, three types of measure–value connection are outlined by the authors – namely, operationalisation, nomination and indetermination. While the first one appears as the neutral, merely technical-representational one (recording a value through a measurement), the authors suggest it already includes issues of selection and inclusion which are, ultimately, political. The second type of connection, nomination, is based on what Bourdieu has more generally discussed in terms of the politics of definition – here specifically, the idea that the impact factor of a journal is a measure of its quality. Of interest are also the connotative aspects of the chosen word – viz. 'impact', with its overtones of shock and damage, which to some may sound as sitting uncomfortably with the scientific enterprise. The third type of connection appears as a counter-strategy, in that it seeks to disconnect or deliberately unhinge the measure-value nexus in place. The third type is usually aimed at creating a relatively under-determined space where new associations can subsequently be established.

Overall, Hesselmann and Schendzielorz show how measures are routinely subject to a sort of Wundtian 'heterogony of ends', whereby unanticipated aims appear along the way, proactively as well as retroactively occasioning opportunities to reshape the means themselves. Measures are, in other words, taken in a becoming imbued with unfortunate mishaps – or exciting opportunities, according to the point of view.

The following piece by Frank Eggert and Nicole Carola Holzhauser adopts a social-psychology perspective informed by information theory and the representational theory of measurement. From this vantage point, the authors castigate the generalist use of the lexicon of measure that abounds among human and social scientists: 'a lot of theoretical problems in the social sciences – they argue – are consequences of basic misunderstandings concerning the question of what constitutes a measurement'. Reference to 'measurements' aims, in many cases, at 'try[ing] to evoke the impression of objectivity and ideology-free specification'. In these cases, more or less implicit appeals to what Paul Feyerabend (1981) once dubbed 'the social authority of science' are achieved by mimicking the discourse of measurement, regarded as foundational in modern natural science. The authors argue these are just 'pseudo-rationalisations'.

Following representational philosophy, they contend that, in order to have real measurement, the units may be arbitrary, but what must not be arbitrary are the scalar relations between values expressed in terms of the unit of measure itself. In other words, what is essential in measurement is *not* 'how to numerically represent attributes that we assume to be measurable', but 'how to decide which attributes and therefore which theoretical terms are such that we can use them in propositions about the world in a meaningful way'. From a representational-theory perspective – which in this sense, can be considered as a continuation of logical neo-positivism – the choice of unit remains arbitrary, given that the unit conveys no meaning in itself. Reference to the whole theoretical construct is necessary: for instance, 'length is not a simple attribute of objects per se but depends in its meaning on a whole theory of the space in which our lengths occur'.

Eggert and Holzhauser admit that, in the psychological and social sciences, measurement is necessarily complicated by the fact that the features to be measured are not immediately visible and not immediately given (although something similar could also be said of several areas in the natural sciences, such as quantum physics and cosmology). We often do not have an immediate grasp of the 'features' that are supposedly entering the measurement of a given social-psychological object or phenomenon. But this is why the authors warn against the use of 'heuristically based measurements': even when formalised, the latter do not refer to actual phenomena, but only constitute 'formal descriptions of the structure of the data' themselves. Thus, it seems as though Eggert and Holzhauser admit a certain performative effect of measures, but regard it as inconvenient and undesirable. Performativity would lead to a generous *and* utterly unpredictable use of numbers. Personality tests, questionnaires and other common social research instruments based on self-reporting or indexing can hardly produce any significant measurement in a rigorous sense. This limitation is not only technical: the construction of an observational measurement apparatus is – as Norwood Hanson (1971) would have diagnosed – 'theory-laden'. So, for instance, one cannot measure social status on the basis of education and income: the latter are, at most, only indices that can be mobilised within a given theoretical construct.

While Eggert and Holzhauser's piece seeks to warn against the sloppy usages of the measurement terminology (such as the confusion between indices and measures), their very argument suggests the existence of that *natura naturans* of measure which with von Freiberg we have proposed to call *virtus*. Varying degrees of investment into form are made drawing from the *virtus* of measure, producing a diversified scenario of measure. If each measure entails a theoretical reconstruction of the world under scrutiny then we should perhaps admit that even faulty measures do in fact portray a world – certainly, an always-different world that can be brought more or less into existence. We find here the roots of a diffraction phenomenon that resonates with the 'time & power' dynamics evoked in the previous section.

An additional factor of diffraction within measures occurs when their use becomes more or less openly rhetorical, opportunistic, cynical, or even merely cosmetic. It is a different limit-case, in which, instead of making one magically believe in the unfathomable power of measurement, the latter is just ornamentally exhibited as a *potiche* (i.e., a pretty and useless decorative object). In the final article of this special issue, Christopher Dorn provides a counter-case to the general argument that measure elicits direct practical

reaction. In the case of hospital rankings in the US, Dorn explains, resistance against metrics most often occurs because actors *have not* internalised the expectations embedded within the metric, and consequently do not simply take them into account in their practical life.

The sheer presence of a measure, Dorn argues, is far from entailing its efficacy. Differently from what happens in academia, the hospital sector seems to have so far simply failed to take rankings seriously. The very multiplication of indices partially contradicting each other makes up for a rather blurred scenario. Dorn reviews a series of factors, ranging from the fuzz of indices that can only loosely and partially be assembled together, to the complications of insurance policies and the informational ecology where media coverage of grave but exceptional events affects people's choices more directly than arrays of numerical values, and where doctors still retain a great deal of personal influence over their patients' views. Dorn uses insights from system theory to explain why reactivity fails. In system theory, as well known, a difference in itself is not enough to produce information: the difference must also *make* a difference, else it remains an undifferentiated difference that cannot 'inform' the system. Only 'internal' differences matter.

The US professional field contributes to explaining the situation. In contrast to other works, physicians are a strong, corporatist profession that seems to have been able to resist the implementation of assessment metrics of their own work that are not based on their own self-understanding of quality and success: 'The professional demand for exclusive quality control – Dorn writes – is reflected in the poor reputation that non-professional evaluations, such as rankings, possess in the professional community.' The 'reputational risk' that ranking could potentially create is thus pre-empted. Despite the current weakness of hospital rankings, though, the author does not deny that an institutional demand is being advanced. In the shorter or longer run, therefore, various testing moments may be expected.

In conclusion, the various articles collected in the special issue document cases where measures are observed *in action* across the vicissitudes of social life. The featured articles also propose distinctive theoretical approaches to measures that can hardly be reconciled. The conversation can thus potentially be continued along two lines: on the one hand, taking into consideration additional empirical cases and situations where the logics at stake may be related, although not necessarily identical, while, on the other, developing a critical theoretical discussion of how different takes on measures may highlight different facets and implications of such a general social phenomenon.

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Notes

1. The sociology of quantification has investigated the extensive work that is required in the production of numbers, indices and indicators (Callon & Law, 2005; Desrosières, 2008; Espeland & Stevens, 2008; Bartl, Papilloud & Terracher-Lipinski, 2019). We seem to live in the historical period when Gabriel Tarde's (1890: §IV, VI) famous prediction appears as nearly verified:

'*il pourra venir un moment où, de chaque fait social en train de s'accomplir, il s'échappera pour ainsi dire automatiquement un chiffre* [Possibly, a moment will come when, from each social fact in the course of being accomplished, a number will be automatically emitted]'. This, of course, has been made possible by previous extensive investment into technical infrastructures and organisational coordination.

2. This aspect has become central in the recent developments of the economic sociology of valorisation practices (Cochoy, 2008; Stark, 2009; Aspers & Dodd, 2015).

3. In this issue, see Pohler's study on the introduction of new pay scales for labourers of a work cooperative. More generally, it is interesting to recall how research in primatology has extended the boundaries of fairness perception to apes: primates appear to be quite susceptible to uneven retributions, and also uneven distributions. See De Waal (2019: §6).

References

Alder K (2002) *The Measure of All Things*. New York: Free Press.

Aspers P, Dodd N (eds) (2015) *Re-Imagining Economic Sociology*. Oxford: Oxford University Press.

Bartl W, Papilloud C, Terracher-Lipinski A (2019) Governing by numbers. Key indicators and the politics of expectations: An introduction. *Historical Social Research* 44(2): 7–43.

Boltanski L, Thévenot L (1991) *De la justification. Les économies de la grandeur*. Paris: Gallimard.

Brighenti AM (2008) Visual, visible, ethnographic. *Etnografia e Ricerca Qualitativa* 1(1): 2–19.

Brighenti AM (2018) The social life of measures. Conceptualizing measure-value environments. *Theory, Culture & Society* 35(1): 23–44.

Brighenti AM (forthcoming) *Face and the City*.

Callon M, Law J (2005) On qualculation, agency, and otherness. *Environment and Planning D: Society and Space* 23(5): 717–733.

Cochoy F (2008) Calculation, qualculation, calqulation: Shopping cart arithmetic, equipped cognition and the clustered consumer. *Marketing Theory* 8(1): 15–44.

De Waal F (2019) *Mama's Last Hug: Animal Emotions and What They Tell Us About Ourselves*. New York: W.W. Norton.

Desrosières A (2008) *Pour une sociologie historique de la quantification. L'argument statistique I*. Paris: Presses des Mines.

Espeland WN, Stevens ML (2008) A sociology of quantification. *European Journal of Sociology/ Archives Européennes de Sociologie* 49(3): 401–436.

Feyerabend PK (1981) *Realism, Rationalism and Scientific Method: Philosophical Papers*. Cambridge: Cambridge University Press.

Hanson NR (1971) *Observation and Explanation: A Guide to Philosophy of Science*. New York: Harper & Row.

Kula W (2014[1970]) *Measures and Men* [*Miary i ludzie*]. Princeton, NJ: Princeton University Press.

Merry SE (2016) *The Seductions of Quantification: Measuring Human Rights, Gender Violence, and Sex Trafficking*. Chicago: University of Chicago Press.

Perelman C, Olbrechts-Tyteca L (1958) *The New Rhetoric: A Treatise on Argumentation*. Notre Dame, IN: Notre Dame Press.

Simondon G (2013[1964–89]) *L'individuation à la lumière des notions de forme et d'information*. Paris: Éditions Jérôme Millon.

Stark D (2009) *The Sense of Dissonance: Accounts of Worth in Economic Life*. Princeton, NJ: Princeton University Press.

Tarde G (1890) *Les lois de l'imitation*. Paris: Alcan.

Thom R (1988) *Esquisse d'une sémiophysique*. Paris: InterEditions.

Von Freiberg D (2017) *Durata e tempo*, ed. Andrea Colli. Bari: Edizioni di Pagina.

Von Uexküll J (2010[1934]) *A Foray into the Worlds of Animals and Humans: With A Theory of Meaning*. Minneapolis: University of Minnesota Press.

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