Parsons, Luhmann, Spencer Brown. NOR design for double contingency tables

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Abstract

Purpose – Cross tables are omnipresent in management, academia and popular culture. *The Matrix* has us, despite all criticism, opposition and desire for a way out. This paper draws on the works of three agents of the matrix. The paper shows that Niklas Luhmann criticised Talcott Parsons' traditional matrix model of society and proceeded to update systems theory, the latest version of which is coded in the formal language of George Spencer Brown. As Luhmann failed to install his updates to all components of his theory platform, however, regular reoccurrences of Parsonian crosstabs are observed, particularly in the Luhmannian differentiation theory, which results in compatibility issues and produces error messages requesting updates. This paper aims to code the missing update translating the basic matrix structure from Parsonian into Spencer Brownian formal language.

Design/methodology/approach – This paper draws on work by Boris Hennig and Louis Kauffman and a yet unpublished manuscript by George Spencer Brown, to demonstrate that the latter introduced his *cross* as a mark to indicate NOR gates in circuit diagrams. The paper also shows that this NOR gate marker has been taken out of and may be observed to contain the *tetralemma*, an ancient matrix structure already present in traditional Indian logic. It then proceeds to translate the basic structure of traditional contingency tables into a Spencer Brownian NOR equation and to demonstrate the difference this translation makes in the modelling of social systems.

Findings – The translation of cross tables from Parsonian into Spencer Brownian formal language results in the design of a both matrix-shaped and compatible test routine that works as a virtual window for the observation of the actually unobservable medium in which a form is drawn, and can be used for consistency checks of expressions coded in Spencer Brownian formal language.

Originality/value – This paper quotes from and discusses a so far unpublished manuscript finalised by Spencer Brown in April 1961. The basic matrix structure is translated from Parsonian into Spencer Brownian formal language. A Spencer Brownian NOR matrix is coded that may be used to detect errors in expressions coded in Spencer Brownian formal language.

Keywords Matrix, Crosstabs, Design with the NOR, Double contingency, Tetralemma, Theory debugging

Paper type Conceptual paper

The crux of the cross tabulation: a reintroduction to the matrix

Many good ideas look simple in retrospect, and some of the most successful management tools are based on such good and simple ideas. The infamous SWOT matrix, for example, is generated by the cross-tabling of not more than two basic distinctions. First, the distinction

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of *positive* and *negative*, and second, the distinction of *internal* and *external* (Weihrich, 1982) or – supposedly originally – *present* and *future* (Humphrey, 2005). The origins of SWOT remain opaque, and its similarity to both structure and content of the Parsonian AGIL scheme is significant enough to justify an article of its own[1] As much as its presumptive grandfather, SWOT has been a milestone and played a crucial role in shaping the world view of managers, academics and, eventually, students, until both and similar tools have increasingly been criticised for their reliance on predefined and contingent sets of distinctions. At least since the 1970s, there is an increasing demand for tables that place their contingency at our disposal and hence enable us to self-determine the coordinates of our systems. Even in that context of dynamism, flexibility and customization, however, we tend to conceive of cross tables as tools that are used in specific situations, then put aside, and maybe keep ready for later applications.

This distanced attitude to matrices is as striking as typical. The reason is that the knowledge of their world-creating power cannot only be experienced in closed scenario-planning sessions, but is omnipresent in popular culture today. Since 1999, there is nothing alien to the idea that *The Matrix* is all around us, that we ourselves are composed of it, and that it is composed of us (Kauffman, 1999). And yet, even the epochal movie plays with our modern desire for the imagination of us as observers independent of *The Matrix*. Thus, the movie, like any form of modern language, remains a blue pill that keeps us at illusive distance to the matrices, to the systems and to the agents as well as their favourite tools, which necessarily are matrices.

Unlike in *The Matrix* movie, the red pill offered in this article does not lead us out of the matrix. Nor will it lead us deeper into the matrix. Our only ambition is to indicate a sequence of the matrix that may be used to detect errors in the matrix. All our operations run in the matrix, and yet, they might eventually open a window not to a world beyond the matrix, but maybe to another form of matrix.

To understand the proposed procedure, we first perform a quick review of a short list of critical updates for the earlier, outdated version of the matrix as coded by Talcott Parsons. We then show that the compiler of this list, Niklas Luhmann, indeed re-coded and updated larger parts of the systems theoretical operating system, but failed to install some of his own updates to all of the core components of his theory platform. As Luhmann coded the latest version of his operating system in the language of George Spencer Brown, the reoccurrences of Parsonian crosstabs, mainly in his theory of social differentiation, produce error messages requesting updates. In the present article, we attempt to code the missing updates. The result is a test routine that also provides a virtual window for observing the actually unobservable medium in which a form is drawn. There is a white rabbit in every system. Here comes ours.

Agent Parsons' crosstabs in the crosshairs of Agent Luhmann: an unfinished theory update

Niklas Luhmann left an incomplete oeuvre. In its given form, it is the result of a work process, a continuous theory development over decades. His publications are stages in this process, always determined by the currently achieved range of vision, by the fascination of realised achievements, by changing interdisciplinary streams and contacts as well as topics taken up by his critics. As a sediment of a historical process, his theory has not found its best shape. For the observer, the theory's internal consistency remains an open problem.

Niklas Luhmann's (1980, p. 5) above judgement, which he originally rendered on Talcott Parsons, applies particularly to those components of his own theory where his emancipation from Parsons remained incomplete. In his reasons for the above judgement, Luhmann's focusses on two major issues of the Parsonian theory programme, and in both cases, crosstabs were in the crosshairs of his criticism. First, he eventually agrees with the well-established criticism of the limited flexibility, scope and conceptual carrying capacity of Parsonian cross tables. Second, he praises as a benchmark and perennial challenge for all future sociological theory development, Parsons' theory in general, and in particular the:

> [. . .] codification of classical sociological knowledge and a treatment of the conceptual understanding of action with the aid of cross-tabulation. But it fails to answer the question of cognitive self-implication [. . .]. Parsons consequently does not himself occur in any of the many boxes of his own theory. And this is ultimately why the theory cannot distinguish systematically between social system and society; it only offers impressionistic, more or less feuilletonistic views of modern society. (Luhmann, 2012, p. 4)

Measured by this standard, any cross tables still remaining in Luhmann's own theory must be understood as error messages that cannot be simply clicked off by suggesting that Luhmann's use of matrices is different from that of Parsons (Künzler, 1989, p. 84). If Luhmann is right that the Parsonian contingency tables are contingent not only because they are made by the cross tabulation of contingent distinctions, but also because they remain confined to the contingent perspective of one – invisibilised – observer, then they do not belong in a theory updated to concepts such as autopoiesis and double contingency. In fact, not even a switch from contingency to confusion matrices would have been satisfying to Luhmann (although some might argue that his entire theory actually presents nothing but a giant confusion matrix), because even these fairly interactive matrices, which are popular in machine learning today, treat "only half of double contingency" (Luhmann, 1995, p. 108).

As is well known, Luhmann was interested, not in a different use of the Parsonian formal language, but rather in an even more formal language, which he found in Spencer Brown (1979). Luhmann did an extraordinarily efficient job of recoding his systems theory, and particularly his later monographs follow a generic pattern that could, in principle, also have been applied in a context similar to that of Flemish Baroque art workshops. Interestingly, however, not all dimensions of his work have received the same attention. This is particularly noticeable with regard to his theory of social differentiation, where the visible and invisible cross tables of old Parsonian style remain in use even in his later works in his derivation of the symbolically generalised communication media (Luhmann, 2012, p. 201) and even the basic forms of social differentiation (Luhmann, 2013, p. 13):

> Few differentiation forms have so far developed in the history of society. It seems that in this field, too, a "law of limited possibilities" applies, even though it has yet to be constructed in a logically conclusive manner (e.g., by cross-tabulation).

Since then, this cross table has been constructed and presented (Roth, 2015, p. 113); however, neither the call nor the response constitutes a solution to the problem that Parsonian cross tables continue to trigger error messages when run on a Spencer Brownian theory platform. That said, the fact that the Luhmannian theory of differentiation obviously remained as impressionistic and feuilletonistic as the Parsonian general theory is all the more unpleasant, as it represents a considerable partition of the Luhmannian theory platform, which is, moreover, also likely to be the most popular one.

The question of how a cross table may be coded in the formal language of George Spencer Brown is therefore critical not only for the further development of the Luhmannian differentiation theory but also for the credibility of his entire theory programme.

Cross tabulation and crossing: the single-distinction matrix of George Spencer Brown

Fortunately, owing to the specific architecture of the Spencer Brown (1979) formal language, we do not have many options to express a cross table. All we have is one cross, which can be copied in arrangements of any number or order. As cross tabulation is not a matter of number but of order, the most basic expression of a cross table (e.g. in the case of a binary distinction combined with itself) is:

With the consequence being:

From this unspectacular observation, we can conclude that cross tables indicate observations that may be easily cancelled or compensated ([I2] as in Spencer Brown, 1979, p. 12) if they cannot avoid cancellation or compensation.

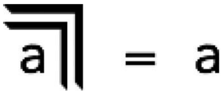
The only option forms of order have to resist discretionary cancellation or compensation is the obscuration of their order. This observation is well established in political contexts, whereas in our context, this effect is normally achieved by ignorance of order. Cross tables are indeed often observed as if the crossed rows and columns, and the distinctions behind them, were located in the same spatial or logical depth. Yet, in these cases, a trained observer can always undermine the necessary ignorance and then easily cancel or compensate the corresponding observation. A more sustainable principle is pursued by cross tables that do not leave obscuration to the eye of the beholder, but rather perform the task themselves. The simplest way to achieve this effect is to cross-table one and the same distinction, in which case it remains ultimately impossible to determine the order between the two, or one, distinction/s. Another and actually more interesting case is that of distinctions that are both too similar to be properly distinguished and yet too different to be collapsed into one. Yet another case is contingency tables that provide double contingency in such way that observers disagree on the order between the distinctions involved[2].

In all these cases, we may observe the emergence and self-maintenance of a dis-/order, which is often associated with the observation of paradox and oscillation, two phenomena we commonly take for glitches in the matrix and try to fix or avoid. While the idea that paradoxes may also be useful for a while and therefore do not need to be avoided or immediately resolved is now fairly well established in management research (Jay, 2013; Miron-Spektor *et al.*, 2017; Smith and Lewis, 2011), the point we wish to make in this article is that the above dis-/order is not only a more or less useful exception to management practice or theory design, but rather can be observed anytime and anywhere, and even strategically so, if we take into account the following considerations.

The matrix as gate to the matrix: the autodesign of an agent

True to C1 in Spencer Brown (1979, p. 28), I2 can be performed anywhere and anytime. This is to say that a double cross, which also indicates the basic of cross tabulation, can be written anywhere over or into (however, never across) any expression, which is consistent with the fact that a double cross normally can be cancelled as easily as it can be compensated. As there is no exception to the rule, this rule applies to all double crosses, including those that resist their cancellation in the above manner. As a consequence, we may write a self-sustaining double cross over or into any desired expression, where it performs, however, a slightly different task than a standard double cross.

In the standard case of C1, we find that:



The double cross makes us cross the two distinctions each from the outside to the inside and, thus, takes us straight to the space in which *a* is written (Spencer Brown, 1979, p. 5).

By contrast, a double contingent double cross, which resists its cancellation, does not allow our observation to easily cross over it; rather, it keeps the observation focused on the oscillation created by the observation of the stubborn combined distinction, such that we continue to observe:

The clou in this expression is that it states that the left arrangement may be confused with the right arrangement, which, in the case of a double contingent double cross, is and is not a tautological expression. In the case of a resistant double cross, the observation remains captured by the double cross; consequently, the mark, and thus the focus of the observation, remains "in between" the two crosses, which results in the observation of the – virtual – white cross between the two black crosses. This observation implies that the observation has shifted from *a* to the space in which *a* is written, because the virtual white cross again is nothing but a cut-out of, or a window to, that space. In other words: a stubborn, double contingent double cross opens a window to the medium of each form over which it is written.

This observation is neither wrong nor a huge surprise, as it fits with the observation that nested crosses may create window shapes, spyholes, tunnels or imaginary values (Engstrom, 2001, p. 46; Hennig, 2000, pp. 161-166; Kauffman, 2001, p. 98; Spencer Brown, 1979, p. 61f) if two *distinct* distinctions are combined.

For example, Hennig (2000, p. 166) argues that a combination of two distinct distinctions may produce four different results: no distinction, first distinction, second distinction and both distinctions, and he continues to illustrate this idea referring to the subsequent figure (Figure 1).

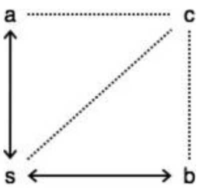


Figure 1.
Unnamed figure in Hennig (2000, p. 166)

In this figure, the distinct distinctions are represented by the two arrows. The vertical arrow is an *a*-switch switching between up and down, whereas the horizontal *b*-switch is switching between right and left. If *s* is the home position, then one actuation of the *a*-switch leads to *a*; one actuation of the *b*-switch to *b*; two actuations of either switch lead back to the home position *s*; and one actuation each to *c*. The home position is thus defined as actuation of neither *a* nor *b*.

The combination of two distinct distinctions may therefore obviously be compared to a Cartesian product of two sets, A = {up, down} and B = {right, left}. If we now define more generally that A = {A, not-A} and B = {B, not-B}, and translate the expressions into Spencer Brown, then the same procedure returns the values as shown in Figure 2.

If we transform Figure 2 into Hennig's small circuit diagram (see Figure 3), then we find that it is congruent with the basic structure of Kauffman's (2001, p. 98) *Planar Graph of the Rhombic Dodecahedron* (see Figure 4).

If we compare Figures 3 and 4, then we realise that, set aside the greater complexity of the latter, both figures present one crucial aspect ignored by the other. In concert with Hennig (2000, p. 166), we find that Figure 3 displays the "neither A nor B" condition as the home position, which is not the case in Figure 4. Conversely, Figure 4 suggests that the diagram is a visualisation of different aspects of one and the same original form (i.e. the outer right cross), an impression not evoked by Figure 3. Yet an ignored aspect, although

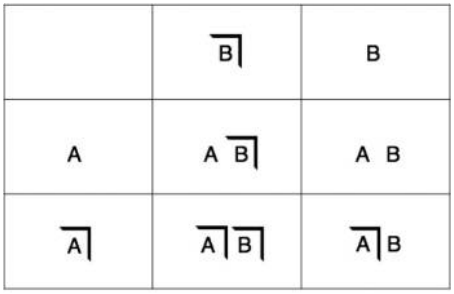


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Figure 2.
Cartesian product of two distinct distinctions

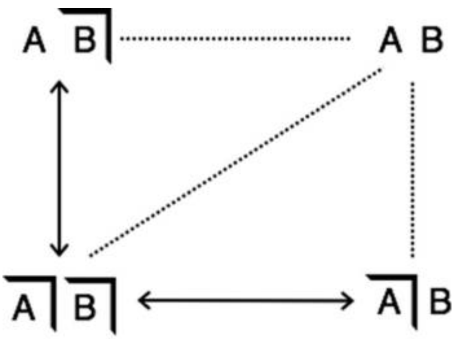

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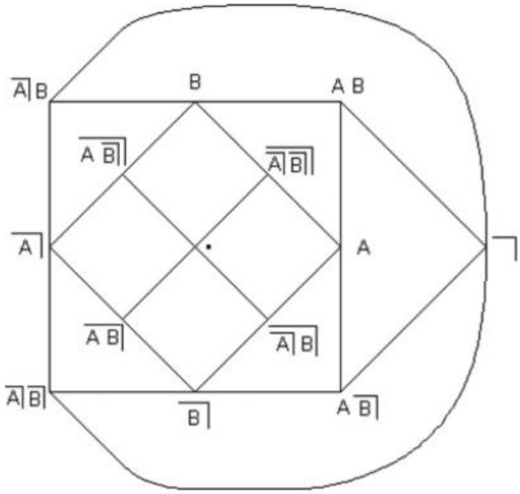
Figure 3.
Cartesian product of two distinct distinctions



Source: Kauffman (2001, p. 98)

Figure 4. Planar graph of the rhombic dodecahedron

strikingly present in both figures, is the observation that both figures present sophisticated variants of the *tetralemma* (Jayatilleke, 1967; von Kibéd, 2006), an ancient structure from traditional Indian logics, which has also been used to define attitudes a judge in court can have towards two conflicting parties (see Figure 5).

If we insist on and combine all omitted observations, then we can make a small series of small and beautiful discoveries.

Hennig is right in stressing that the "neither *a* nor *b*" is the home condition for the crossing of two distinct distinctions, because the "neither [. . .] nor" positively is why and how the Laws of Form are designed. Markus Heidingsfelder, Habib University Karachi, secured a copy of an unpublished manuscript finalized by George Spencer Brown in April 1961. The cryptic title of this "account" is *Design with the NOR* and it starts with the words:

> Recent years have seen the development of an electronic device, the transistor NOR unit, which, amongst other applications, is taking the place of relays in industrial automation and control systems. With a new unit so unlike the old, it is not surprising that the forms of algebra suitable for relays have proved unsuitable for NOR units. Whereas it has not been difficult to build up an ad hoc arrangement of such units for a given function, the lack of suitable calculus has hitherto restricted both the assessment and the choice of such arrangements in practice. The following account, in two parts, aims to give some of the principles of control design with NOR units [. . .] showing how, starting with intuitive methods, we can proceed to the use of more general rules. (Spencer Brown, 1961, pp. Part I, 1)

Neither	Either	Or
	Both	

The fifth position

Source: Author provided

Figure 5. The tetralemma

Spencer Brown then proceeds to demonstrate that a NOR gate is a universal logic gate that can replicate the functions of all other logic gates; to show that this effect facilitates the design of efficient automation and control systems; and to develop a prototype of the later Laws of Form. The manuscript makes only four references, all which, despite one self-citation, appear on the first page of the second part, where Spencer Brown prepares what Kauffman (2001, p. 91) cursorily refers to as epistemological turn:

> It has been known since 1880 that an operator interpreted as neither [. . .] nor [. . .] could be used as a universal logical constant. The first account of this fact was given[2] by C.S. Peirce in a paper which remained unpublished till 1933. Meanwhile the operator was twice independently rediscovered, first by Edward Stamm, who published[3] in 1911, and then by H.M. Sheffer, who published[4] in 1913. All three discoverers adhered rigidly to the orthodox notion that logical operations (other than NOT) are essentially binary, and all adopted notations reflecting this belief. Sheffer's is the best known and we shall use it in examples here. (Spencer Brown, 1961, pp. Part II, 1)

It is interesting, for two reasons, to note that Spencer Brown proceeds to deconstruct Sheffer and spare Peirce. First, Spencer Brown eventually desists from the subsequent condescending discussion of Sheffer's "awkward" system with a conclusion that seems to converge with Peirce:

> So whatever, in logic, the industrial NOR unit represents, it is certainly not the Sheffer stroke. [. . .] To say that the industrial NOR unit represents an operation hitherto unknown to logic would perhaps be too strong, although if we interpret "unknown" as "unfamiliar" the claim is justified. For such an operation, even if known, has never been taken as standard. If we signify it by a mark

> [. . .] called "cross" we can compare it with the Sheffer stroke thus. (Spencer Brown, 1961, pp. Part II, 2)

Thus, we read that the mark positively is the NOR. We could, therefore, and in line with the above discussion of Figures 1, 3 4 and 5, visualise the mark called cross as a *Peirce's arrow* form taken out of the form of the tetralemma (see Figure 6). . .

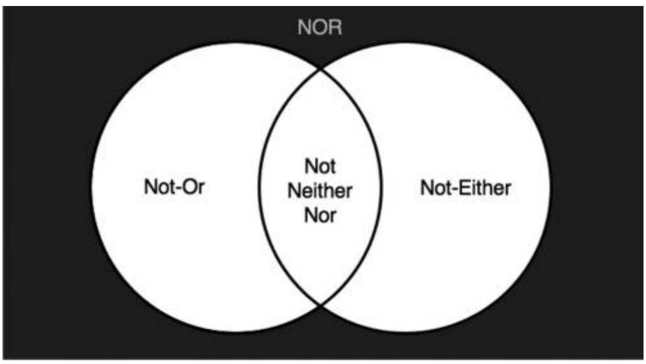


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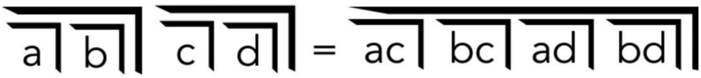
Figure 6.
The mark: *almost* a tetralemmatised Peirce's arrow (left)

If it were not for the fact that, in the Laws of Form, traditional intersections are prohibited and replaced by concepts such as depth, time or perspective, and that NOR gates do not discriminate between *either*, *or* and *both* in the end. Technically, the three categories may therefore be combined into one, which, as a result, gives us the mark containing both the mark (NOR) and the unmarked content (the rest). If we further consider that NOR gates are equivalents to AND gates with negated inputs, then we find that Spencer Brown's mark is the inverted complement to the Sheffer stroke. Consequently, in the Laws of Form, AND becomes NOT NOR, which is a special case of NOR NOR, that is the double or empty cross which may be confused with the fifth position of the tetralemma. In short, Spencer Brown's mark is both a condensed Peirce's arrow and a doubly crossed Sheffer stroke, thus effectively both being and containing the two basic Laws of Form as much as all of its derivations as suggested by Figure 4. Neither Spencer Brown nor the above authors explicitly communicated this information, which is the second reason why we found a short discussion on Spencer Brown's short critique of the first discoverers of the NOR to be important.

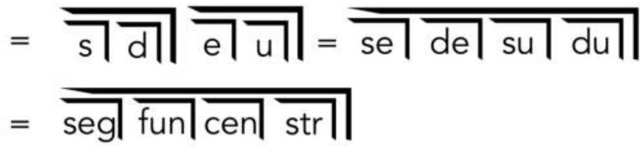
Once we have taken the NOR gateway to the form, then the possibly quickest way to model matrices is to slightly deviate from the above figurative proposals and simply indicate that matrices are forms of distribution such as:



In this case, the arrangement on the left-hand side presents the row and column vectors, whereas the arrangement of the right-hand side presents the elements of this *2x2 matrix*, which is the entire expression[3]. A concrete example of the translation is present in Figure 7.

In this figure-equation, the initial matrix structure is translated into the formal language of Spencer Brown, whereat *similar* is translated into *s*, *dissimilar* into *d*, *equal* into *e* and *unequal* into *u*. We then find that these values are distributed into what eventually becomes the Spencer Brownian version of the original matrix containing *seg*mentation, *fun*ctional differentiation, *cen*tralisation and *str*atification. Moreover, we find that the expression could be further simplified, as the relationships between similar and dissimilar as well as equal and unequal may be considered as consequential. In the end, however, the decision as to

		Equal	
		+	–
Similar	+	Segmentation (Families, tribes, nations, etc.)	Centralization (Civilizations, empires, etc.)
	–	Functional Differentiation (Economy, Science, Art, etc.)	Stratification (Castes, estates, classes, etc.)



Source: Roth (2015, p. 113), author provided

Figure 7. The matrix structure of social differentiation and the equivalent Spencer Brown notation

whether or not the entire expression may be cancelled is itself cancelled again by our inability to determine whether the similar/dissimilar or equal/unequal is the dominant arrangement. Thus, once more, our observation remains captured by the double contingent matrix, which again confirms that such capricious matrices are proper oscillator functions providing us with a rabbit hole, window, gate or tunnel to the medium in which is drawn a form of reference. In fact, a NOR gate such as the last sequence presented in Figure 7 can positively be observed, inter alia, as an agent that scans the medium of any given form for errors, a circumstance that we shall be demonstrating in the subsequent final section of this article.

A glitch in the matrix: demonstration and conclusion

Matrices are not necessarily outdated and incompatible modules of social theory in general and a Spencer Brown-inspired social systems theory in particular. This is apparent because, first, in this article we showed that matrices are forms of order and distribution that can be translated into Spencer Brownian equations, and, second, we found that matrix issues have been the problem underlying and motivating the discovery and development of the Laws of Form.

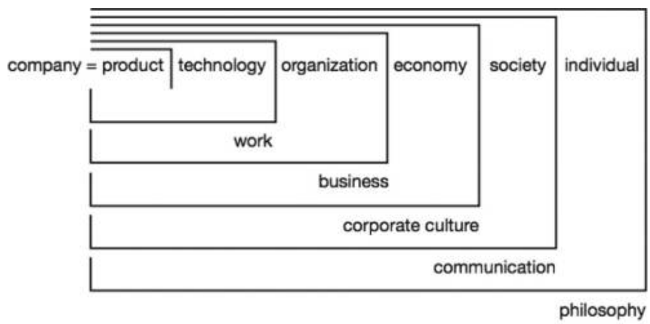
The question therefore is which matrices are suitable for social systems theory, and there is clear evidence that the popular ceaseless repetition of simple basic forms of nested "re-entries" is not what Spencer Brown had in mind when he invented his Laws. We have hitherto only sketched society in various ways; the point is to calculate it.

If we wish to conceive of society in general and Luhmann's theory of society in particular as "networks [. . .] (c)omposed of Brownian marks", and thus as "mathematical abstraction of digital networks consisting entirely of 'nor' gates" (Kauffman, 1978, p. 179), then the Laws of Form indeed provide us, inter alia, with a markedly efficient and elegant form of matrix calculation.

As matrices as much as crosses may be confused with observers, or even are, "in the form, identical" with observers (Spencer Brown, 1979, p. 76), we may find that our stubborn doubly contingent crosses are not passive mental tools but performative and communicative observers. In this sense, all above crosses, windows, mirrors, gates and matrices are agents that can be inserted anywhere in a matrix to perform, among others, simple consistency and error checks.

See, for example, the subsequent expression, which presents a compact essay to code the concept *company* as an expression in the language of George Spencer Brown.

Let us image that our translated matrix sequence presented in Figure 7 observes the arrangement presented in Figure 8. As our matrix sequence is a NOR gate, it will produce



Source: Baecker (2006, p. 128)

Figure 8.
The general model of the firm

no output unless it does not receive any input at all. In our case, input is a matter of the presence or absence of one of the four basic forms of social differentiation: segmentation, centre-periphery-differentiation, stratification and functional differentiation. If our matrix agent detects at least one of these basic social forms, then it remains passive, whereas it returns a warning signal in case no form of social differentiation is detected at all. This is to say that our matrix agent is useful for the scanning of other social matrixes (as it is rooted in the foundational paradox of sociology and covers all so far known forms of social differentiation) and that it is useful for the scanning of social matrixes only. As outlined in the precedent section, the focus of the operation is on the medium in which the form of reference is drawn.

When scanning Figure 8, our matrix agent detects that this model stands out from the crowd of standard theories of the firm which usually tend to neglect society (Thompson and Valentinov, 2017). There is, however, an error detected concerning the medium of the form named *individual* because there is no medium at all: If individual is marked as form (witness "its" cross), and if we assume that the medium of individual is *not* society (and the medium of society not economy, [. . .]), then the individual is indeed modelled as a form without a medium. This issue is debugged if we delete the cross over individual and proceed to assume that the figure is to state that society is a form in the medium of the individual. In this case, however, our agent triggers an alarm because it is not sure whether individual refers to any of the four forms of social differentiation. We might now proceed to assume that individual is a specific form of segmentation (of modern societies at least), which cancels the error warning. Yet, now we are left with a society, the medium of which is the individual. Hmm. Alternative, and more straightforward[4], interpretations as per Appendix 2 in Laws of Form, would include "if society, then individual" (and "if economy, then society", [. . .]), but, again, we are not sure if this is what the Luhmann-inspired author actually had in mind. Maybe Dirk Baecker meant to express that society is a system that makes individuals who, however, need to be located in the environment of the system called society. Yet, this option is again cancelled by *Consequence 2* in Spencer Brown (1979, p. 32):

$$\overline{ab}\rceil\, b = \overline{a}\rceil\, b$$

From which it would follow that individuals are in society, too, now. Ultimately, there is not much to prevent the entire model from being cancelled into the short expression according to which firms are forms of products drawn in the medium of individual(s), which might mean to say that firms are products that make individuals or individuals who make products, all of which are observations for which we need neither Luhmann nor Spencer Brown.

In this respect, matrix agents might prove able to detect potential errors in the matrix. As agents are matrixes that are easily confused with observers, their operations might easily be confused with actions and therefore susceptible to psychologisation; in which case, the above agent might be confused with the author. From less individual- or person-centred perspectives, however, we find that agents may simply be more or less stable matrix sequences that perform internal consistency checks of the matrix. As much as they positively can be observed to be useful for the redesign of the matrix, so too may they (be) redesign(ed) in the future, with the latter observation being the most intriguing for observers fascinated by the virtuality of a reality that today includes virtual windows for the observation of phenomena as virtual as media.

The greater goal behind the observation of concrete agents and matrices, and thus behind this article, however, remains the vision of a not too distant future in which we use the Laws of Form not only to frame fancy sketches, but rather to formally calculate society. This challenge is great but the stakes could not be higher. If it is true that we live to see the digital transformation to a next society (Baecker, 2007; Lehmann, 2015), then one way to make our disciplines count (again) in the future is to translate figurative book knowledge into computer logic rather than use computers to write just another book or article. For this to happen we might indeed need to first understand each other as circuit diagrams before we transform ourselves into arrangements such as the subsequent C++ poem (Bezzara, 2012):

```
int main()
  {
    int i = 0;
    i++;
    i--;
    return i;
  }
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Notes

1. The AGIL scheme is designed by the cross-tabling of *internal/external* and *instrumental/consummatory* orientation (Parsons, 1960, p. 470), the latter of which Luhmann (1980, p. 9, 1988, p. 130) adequately understood as a distinction between *future* and *presence*. Both versions of SWOT therefore each combine one of the distinctions from the AGIL scheme with the guiding distinction of morality, which is the code of *good* versus *bad*. Yet, the inventors of SWOT claim to have followed their own inspiration, and seem to be more concerned with the *Who* than the *How* of their invention: "We started as the first step by asking, 'What's good and bad about the operation?' Then we asked, 'What is good and bad about the present and the future?' What is good in the present is Satisfactory, good in the future is an Opportunity; bad in the present is a Fault, and bad in the future is a Threat. Hence S-O-F-T. This was later changed to SWOT—don't ask. (I'm told that Harvard and MIT have claimed credit for SWOT [. . .] not so!)" (Humphrey, 2005, p. 7).
2. The differentiation theoretical cross tabulation requested by Luhmann (2013, p. 13) and visible in Roth (2015, p. 113) makes a fine example for all these cases, as it is produced by the combination of the distinctions *similar/dissimilar* and *equal/unequal*. As these two distinctions, for their part, are neither dissimilar nor equal, and their logical order is perfectly debatable to a point that one is assumed to be the self-application of the other, they made the perfect foundational distinctions of an entire discipline, sociology.
3. The above equation is an educated guess by the author and is twice independently confirmed by two different proofs given by Boris Hennig, Ryerson University Toronto, and Martin Rathgeb, University of Bonn.
4. Hennig (2000, p. 168) points at the fact that Spencer Brown never had any intention of applying his formal language to the description of form–medium relationships. According to Hennig, the Spencer Brownian cross can only indicate dis-/similarities between objects of observation and may not be used to describe and analyse complexity slopes. To our reading, however, Hennig is underestimating the cross, which is a NOR gate rather than a simple NOT gate, and therefore the perfect incarnation of a complexity slope. Our form–medium reading of Spencer Brown may therefore be defended as long as we take care not to – be it even unintentionally – confuse marked und unmarked sides of the distinction. In fact, Hennig remains right in insisting that the marked side – originally – be the "outside" (270° section) and *not* the inside (90° section) of the mark. See Weiss (2006, p. 182) for an argument for the reverse order.

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