The origin of the valency metaphor in linguistics

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The aim of this squib is to question the popular belief that the metaphor of *valency* was introduced to linguistics by Lucien Tesnière in the middle of 20th century. Rather, we show that it was first used by Charles Peirce half a century earlier, leading to apparently independent – but probably mediated by Roman Jakobson – 'discoveries' of this metaphor by linguists in the Soviet Union, Holland, USA and indeed France.

Keywords: valency, Tesnière, Peirce, Jakobson

The focus of this squib[1] is the valency metaphor in linguistics – and only the metaphor. In particular, I am not concerned with the history of the idea – expressed by this metaphor – that different words (or predicates) may combine with a different number and type of words (or predicates), with the verb acting as the centre of the sentence. As is well known, this idea is present already in Bühler (1934) and – in a formal guise – in Ajdukiewicz (1935), and it may be traced to medieval grammarians, if not further (Baum 1976, pp. 30–32). Neither am I interested in other linguistic inspirations from chemistry, as in Jespersen (1937), where a general idea of describing sentences with symbols, just like compounds are described with symbols in chemistry, is present.

It is widely believed that the metaphor of valency, used to describe the combinatory potential of words, was introduced to linguistics by the French linguist Lucien Tesnière. The following quotes are typical:

–   *The term* valency *(Fr.* valence*) was introduced into linguistics by Lucien Tes-
    nière… He took the term valency from chemistry, in effect comparing words to
    atoms…* (Fischer 1997, p. 40)
–   *Zur Chronik der Valenztheorie gehört die allgemein bekannte Tatsache, dass der
    französische Linguist Lucien Tesnière den Begriff der Valenz in die Sprachwis-
    senschaft eingeführt hat.* 'The chronicle of valency theory includes the gener-
    ally known fact that the concept of valency was introduced into linguistics by
    the French linguist Lucien Tesnière.' (Pongó 2003, p. 11)
–   *The term 'valency' was first introduced by Tesnière who borrowed it from chem-
    istry.* (Luraghi & Parodi 2008, p. 198)
–   ***valency** (n.) A term introduced by the French linguist Lucien Tesnière…* (Crys-
    tal 2008)
–   *The linguistic meaning of valence derives from the definition of valency in chem-
    istry. This scientific metaphor is due to Lucien Tesnière…* (English Wikipedia,
    Valency (linguistics))[2]
–   *While the notion of valency as such was introduced in Tesnière (1959), aspects
    of grammar and lexicography subsumed under this term have been recognized
    since the early days of linguistics…* (Hellan et al. 2017, p. 1)[3]

Tesnière is rightly honoured as the father of valency theory: the breadth and depth
of valency considerations in *Éléments de Syntaxe Structurale* (Tesnière 1959) were
unparalleled at the time, and it is difficult to overestimate his impact on especially
European linguistics of the 20th and 21st century. However, it is little known that
the metaphor of valency had also – apparently independently (but see below) –
appeared in at least three other linguistic works, set in three different national tra-
ditions, before the *Éléments* were first published.

   The best known of these works is the textbook *A Course in Modern Linguistics*
by the American structuralist Charles F. Hockett (1958). He uses the term *valence*
on pp. 248–254 and it is clear from the discussion that he does not understand it
as a purely surface syntactic notion, but he also denies a purely semantic under-
standing of valency – he relegates it to the domain of 'deep grammar'. For exam-
ple, when considering the sentences: (a) *She's singing*, (b) *She's running*, (c) *She's
singing a hymn*, (d) *She's running the car*, he says this: *The valence tie between* sing
*and its subject is the same whether the verb is followed by an object or not. The
valence tie between* run *and its subject, when no object follows, is not the same as
that between* run *and its subject when an object follows, but rather the same as that*

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2.   Accessed on 27 September 2017.

3.   In fact, even assuming that Tesnière is the (only) author of this metaphor, the last statement
is not fully accurate, as the term *valence* already appears in Tesnière (1953, p. 9).

between run *and its object* (Hockett 1958, pp. 250–251). While the above quote talks about *valence tie*, suggesting perhaps bidirectionality of such links, other fragments make it more clear that Hockett uses the term *valence* in the sense of *active valency* (e.g., when he mentions morphemes seeking something in the context). Interestingly, Hockett also extends this notion to cases of contextual pronoun resolution (pp. 249, 253–254).

The valency metaphor makes a much earlier appearance in another structuralist monograph, *Structurele Syntaxis*, written by the Dutch linguist Albert Willem de Groot (1949). There, the term *valentie* (or fuller *syntactische valentie*) is scattered throughout the book, appearing for example on pp. 78, 89, 94, 110–111, 114–115, etc., until 258–259. An exhaustive analysis of de Groot's understanding of valency is well outside the scope of this squib, but – as convincingly argued in Ágel (2000, p. 30, fn. 18) – it is much broader than Tesnière's understanding of this term, as it is used for all kinds of syntactic relations, and not only between words, but also between larger constructions.

Finally, apparently the first time the valency metaphor appeared in print in a strictly linguistic work was in a relatively little known 1948 paper *O grammatičeskoj kategorii* (*О грамматической категории* 'On grammatical category') by the Soviet linguist Solomon Davidovič Kacnel'son (Соломон Давидович Кацнельсон). There, the term *sintaktičeskaja valentnost'* (*синтаксическая валентность* 'syntactic valency') is used (on p. 132) to denote the combinatory potential of words within a sentence, and this syntactic potential is assumed to be derived from the lexical meaning (Ágel 2000, pp. 30–32, Nübler 2003, p. 1209). While everywhere else in the world Tesnière was credited with the valency metaphor, in the Soviet Union this idea was commonly attributed to Kacnel'son,[4] and this attribution may also be found in Russian Wikipedia, under *Valentnost' (lingvistika)* (*Валентность (лингвистика)* 'Valency (linguistics)').[5]

Although – as exemplified above – it is widely believed that the valency metaphor was introduced to linguistics by Tesnière, many linguists working within the German tradition of valency theory have been aware of some of the apparently independent introductions of this metaphor into linguistics; but apparently very few, if any, have been aware of all three cases listed above. Let us consider the 2-volume (1600-page) handbook collection *Dependenz und Valenz /*

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4. For example, in the editorial footnote to the posthumously published paper Kacnel'son (1987 p. 20): *Предлагаемая вниманию читателей статья посвящена понятию валентности, введенному С. Д. Кацнельсоном в обиход лингвистической теории в 1948 г.* 'The present article is devoted to the concept of valency, introduced by S. D. Kacnel'son into the use in linguistic theory in 1948'.

5. Accessed on 27 September 2017.

Dependency and Valency (Ágel et al. 2003) as a representative sample of writings on valency. Of these, the papers *Valenz und Sprachtypologie* (Xrakovskij 2003) and *Metataxe: ein Dependenzmodell für die computerlinguistische Praxis* (Schubert 2003) mention both Kacnel'son (1948) and de Groot (1949) (but not Hockett 1958), the paper *Kontrastive Fallstudie: Deutsch – Russisch* (Nübler 2003) talks more extensively about the proposal in Kacnel'son (1948) (but does not mention de Groot 1949 or Hockett 1958), and the paper *Das Valenzkonzept in der Grammatikographie: ein Überblick* (Engel 2003) acknowledges de Groot (1949) and Hockett (1958) (but not Kacnel'son 1948).

How is it possible that within the space of 10 years (from Kacnel'son 1948 to Hockett 1958) four linguists working in four different countries independently came up with the valency metaphor? The answer I would like to suggest is that these independent discoveries were not independent at all but may have had their ultimate origin in the writings of the American philosopher and logician, Charles Sanders Peirce.[6]

In his 1897 paper *The Logic of Relatives*, Peirce introduces this metaphor very clearly. He starts by talking about *relatives*, i.e., words (p.162) or equivalents of words or phrases (p.167) with a number of slots to be filled before they can express full propositions. He illustrates this notion with examples such as: —*is a man* (a monadic relative) and —*is a lover of*— (a dyadic relative), and mentions the possibility of higher relatives with a *plurality of blanks*. Then, he goes on saying that a *chemical atom is quite like a relative in having a definite number of loose ends or "unsaturated bonds," corresponding to the blanks of the relative* (pp.168–169). He exemplifies this metaphor with the sentence *John gives John to John* and the following two figures (p.169), where the right-hand side figure is the ammonia compound (one nitrogen atom combining with three hydrogen atoms):
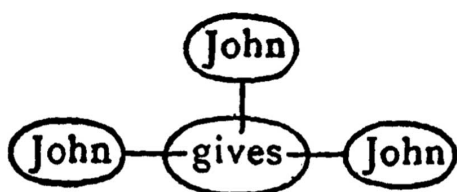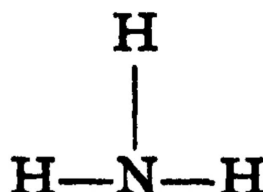

Figure 1.

Figure 2.

The term *valency* itself appears on the following two pages (Peirce 1897, pp.70–71).

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6. To the best of my knowledge, the connection between Peirce and modern valency theory was first pointed out in Askedal (1991), and has so far been confined to three hard-to-get publications of this author.

If the valency metaphor originated in a 1897 paper, how come it surfaced in structuralist linguistics only over 50 years later? And why none of the linguistic works cites Peirce (1897)? Much of the following is speculation, but one that perhaps has some degree of plausibility.

Let us start by citing the observation that *due to his inability to retain an academic position, the body of Peirce's work in his later years did not receive the wide audience it deserved* and, in particular, *his semiotic fell into some obscurity by the early part of the 20th century* (Liszka et al. 2006, p. 2589). It was only in the mid-1920s that a first anthology of Peirce's writings was published, and the breakthrough came in 1930s, when the first 6 volumes of *The Collected Papers of Charles S. Peirce* (referred to as CP by Peirce scholars) were published by the Harvard University Press. Of these, volume 3, published in 1933, contained *The Logic of Relatives*, and volumes 1, 4 and 5, published in 1931, 1934 and 1935, respectively, contained other references to *valency* in the context of logic and semiotics (cf. CP 1.288–292, 4.309 and 5.469). This goes some way towards the explanation of the late adoption of Peirce's metaphor in linguistics, but still leaves the roughly 20-year gap to be accounted for (between 1933, when the 3rd volume of Peirce's *Collected Papers* was published, and, say, 1953, when Tesnière's *Esquisse* appeared), as well as the lack of explicit references to Peirce in relevant works by Kacnel'son, de Groot, Tesnière and Hockett.

The possibility I would like to put forward is that at least some of the linguists who used the valency metaphor had not come across it directly in Peirce's writings, but rather in a second-hand manner, by word of mouth – perhaps it was mentioned by some vivid reader of Peirce at a linguistic conference or two, then perhaps forgotten by the recipients of this idea and 'rediscovered' by some of them as their own.[7] In fact, the identity of this 'vivid reader of Peirce' immediately suggests itself. As is well known, Roman Jakobson was enthusiastic about Peirce – his fascination is felt in the title of the 1977 paper *A Few Remarks on Peirce, Pathfinder in the Science of Language* (reprinted in Jakobson 1980), a paper containing explicit references to *The Logic of Relatives.* In fact, he was almost solely responsible for Peirce's impact on linguistics (Liszka et al. 2006, p. 2593).[8] Jakobson

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7. Probably many readers of this squib have had a similar experience of coming up with an original idea and realising later on that essentially the same idea was expressed in a publication they had read some time ago.

8. Jakobson himself lamented over the lack of prior interest of linguists in Peirce's work, e.g.: *Half a century of Peirce's semiotic drafts are of epochal significance, and if they had not remained for the most part unpublished until the 1930's, or if at least the printed works had been known to linguists, they would certainly have exerted an unparalleled influence upon the international development of linguistic theory* (Jakobson 1965, pp. 23, reprinted in Jakobson 1980, p. 346), and: *…many things could have been understood earlier and more clearly if one had really known*

probably began to study Peirce right after his move to the USA in 1941 (Bradford 1994, p. 111). This means that, even if the valency metaphor was present already in the 1943 redaction of Tesnière's *Éléments* mentioned in Kahane & Osborne (2015, p. xxxvii),[9] it could have been mediated by Jakobson's interest in Peirce.

Of course, it is impossible at this stage to prove that all of Kacnel'son, Tesnière, de Groot and Hockett heard about Peirce's valency metaphor directly from Jakobson, but it is possible that some might have talked to him during the 1948 International Congress of Linguists in Paris, where he presented the paper on *The Phonemic and Grammatical Aspects of Language and Their Interaction* (Jakobson 1949), and at least Hockett could have heard about this metaphor at the 1952 Joint Conference of Anthropologists and Linguists in Indiana, which they both attended.[10]

Let us take stock. First of all, while Tesnière is rightly credited as the author of a comprehensive valency theory, he is often wrongly credited as the (only) inventor of the valency metaphor – roughly the same metaphor may also be found in Kacnel'son (1948), de Groot (1949) and Hockett (1958). Second, it is rather surprising that four linguists from four different countries independently came up with a similar metaphor, so an alternative explanation should be sought. A possible explanation is that this idea was not 'discovered' repeatedly and independently, but rather has a common origin, namely, Peirce's 1897 paper *The Logic of Relatives*, where the valency metaphor for combinatory potential of predicates seems to appear for the first time. Third, the plausibility of this explanation increases once we realise that, although this metaphor appeared in print first in 1897, some fifty years before it was used by structuralists, this publication really became visible to the world only in 1933, when the 3rd volume of *Collected Papers* was published, and to linguists perhaps only in 1940s, when Roman Jakobson took keen interest in Peirce. Thus, the timing seems to be exactly right. Finally, the lack of references to Peirce could perhaps be explained if the metaphor was only men-

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Peirce's landmarks. I must confess that for years I felt bitterness at being among linguists perhaps the sole student of Peirce's views. Even the brief remark on semiotics in Leonard Bloomfield's Linguistic Aspects of Science *seems to go back to Charles Morris' commentaries rather than to Peirce himself* (Jakobson 1977, p. 1028–1029, reprinted in Jakobson 1980, p. 34).

9. This could perhaps be established, depending on how well dated are the drafts of *Éléments* kept in the archives of Bibliothèque Nationale de France.

10. In the address closing the conference, published in 1953 and reprinted in Jakobson (1971), which contains references to *one of the greatest pioneers of structural linguistic analysis, Charles Sanders Peirce* (p. 555), *who… must be regarded as a genuine and bold forerunner of structural linguistics* (p. 565), Jakobson mentions a paper distributed by his *old friend C. F. Hockett* (p. 559). Apparently, the publication of Jakobson's address was the first time Peirce's work was acknowledged by a linguist in print (Preucel 2006, p. 63).

tioned in passing by Jakobson at conferences or in individual conversations. While this part of the reasoning is rather speculative, it seems more plausible than the alternative, namely, that the valency metaphor was proposed completely independently at around the same time by four different linguists working in the Soviet Union, Holland, France and the United States.

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