SOME REMARKS ON "SOME REMARKS ON THE KANT-JÄSCHE LOGIC DIAGRAMS"

Algumas observações sobre "Some remarks on the Kant-Jäsche logic diagrams"

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Abstract: I comment on five points of the paper "Some remarks on the Kant-Jäsche logic", by Castro-Manzano and Reyes-Cárdenas, about which either complementation is necessary, or I have a different interpretation.
Keywords: Wild quantity; accidental judgments; diagrammatic autarchy.

Resumo: Comento sobre cinco pontos do artigo "Some remarks on the Kant-Jäsche logic", de Castro-Manzano e Reyes-Cárdenas, em relação aos quais ou complementação é necessária, ou tenho uma interpretação diferente.
Palavras-chave: quantidade coringa; juízos acidentais; autarquia diagramática.

The paper of Castro-Manzano and Reyes-Cárdenas (2019) fills an important gap in the literature on diagrammatic methods of proof. They analyze the few logical diagrams used by Kant and annotated by Jäsche (*Log*, 9: 1-150), to scrutinize the internal structure of categorical judgments. However, I disagree with them on five points, about which either complementation is necessary, or I have a different interpretation.

I will comment on them below, in the order in which they occur in the paper.

1. Wild quantity (Castro-Manzano and Reyes-Cárdenas, 2019, p. 10)

Castro-Manzano and Reyes-Cárdenas stated that "[Kant´s assessment of singular statements as universal judgments] is consistent with the tradition that treats universal and singular quantification as some sort of wild quantity […]" without explaining what that means. "Wild quantity" expresses Leibniz's treatment of singular quantity in the context of syllogistic. According to Leibniz (*apud* Englebretsen, 1988), singular quantity can be assessed both as a universal quantity and as a particular quantity, provided this assessment is accomplished homogeneously. "Homogeneously" means that if a singular statement is treated as a universal judgment, all other singular statements in the syllogism should also be treated as universal judgments. Also, if a singular statement is treated as a particular judgment, all other singular statements in the syllogism should also be treated as particular judgments. "Wild quantity" is not something that relates *both* to the singular and the universal quantity, nor is it a relation between singular and universal quantity, as suggested by Castro-Manzano and Reyes-Cárdenas; it is related exclusively to singular quantity. A syllogism is valid if, and only if, in some homogeneous interpretation in the way described above, it is valid. This means that Kant's solution – the identification of singular statements with universal judgments – is not necessary in all cases. Thence it is not the most general solution.

For example, the validity of the inference "All humans are mortal. Socrates is human. Hence, Socrates is mortal." can be demonstrated both assessing homogeneously singular quantity as a universal quantity and assessing homogeneously singular quantity as a particular quantity. If we evaluate it homogeneously as a universal quantity, the inference is an instance of the valid mood BARBARA. If we assess it homogeneously as a particular quantity, the inference is an instance of the valid mood DARII. On the other hand, if we evaluate it, for example, in the premises as a particular quantity and the conclusion as a universal one, the inference is an instance of the invalid mood AIA of the First Figure.

2. Particular judgments (Castro-Manzano and Reyes-Cárdenas, 2019, pp. 10-11)

Jäsche's Logic gives two diagrams for particular judgments. First, it provides the diagram of Figure 1(a), then it gives the diagram of Figure 1(b), both related to the particular judgment "Some *a* is *b*."

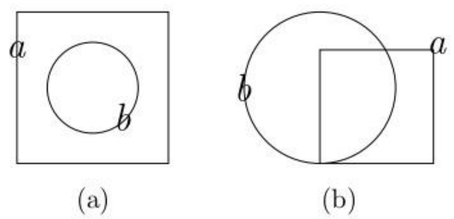

Figure 1. Diagrams for particular judgments (*Log*, 9: 103).

Kant states that the first diagram expresses:

- some of what belongs under *a* is *b* (*Log*, 9: 103);
- some of what belongs under *a* is not *b* (*Log*, 9: 103).

The combination of these two conditions characterizes what Nikolai Vasiliev called "accidental judgment" (*apud* Bazhanov, 2011, p. 94).

According to Kant, these two conditions are also expressed by the second diagram. Still, they diverge on a third condition: the first diagram also shows that the subject *a* is a broader concept (*conceptus latior*) than the predicate (*Log*, 9: 103), while the second diagram also expresses that some of what belongs under *b* is not *a* (Log 9: 103).

If *S* is a first-order predicate that stands for the subject *a* and *P* is a first-order predicate that stands for the predicate *b*, the two first conditions, common to the two particular judgments, can be formalized, respectively, by:

(1) $\exists x\, (Sx \wedge Px)$

(2) $\exists x\, (Sx \wedge \neg Px)$

The third condition related to the first diagram can be formalized by:

(3) $\forall x\, (Px \supset Sx)$

And the third condition related to the second diagram can be formalized by:

(3') $\exists x\, (Px \wedge \neg Sx)$

It is not difficult to show that the following formula is first-order valid:

(4) $\exists x\, (Px \wedge \neg Sx) \equiv \neg \forall x\, (Px \supset Sx)$

The formula (4) establishes that the particular judgments diagrammatically represented by Figure 1(a) and Figure 1(b) are mutually exclusive and jointly exhaustive. It is a logical *finesse* from Kant.

Because of the two first conditions, common to both types of particular judgments, the relations of the square of oppositions do not hold; and the *conversio simplex* holds only of the second type of particular judgment.

3. Infinite judgments (Castro-Manzano and Reyes-Cárdenas, 2019, p. 12)

Figure 2 shows the diagrammatic representation of the infinite judgment "All *a* are *non-c*" given by Castro-Manzano and Reyes-Cárdenas, based on what Kant says about infinite judgments (*Log*, 9: 104).

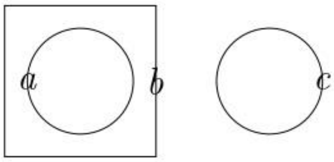

Figure 2. Diagram for an infinite judgment.

The representation is correct, but there is no explanation as to why infinite judgments have to be represented this way. My answer to the accuracy of this representation is as follows:

Kant contrasts infinite judgments ("All *a* are *non-c*") with negative judgments ("No *a* is *c*"); he gives, as examples, "All human souls are non-mortal" ("nichtsterblich") and "No human soul is immortal" ("unsterblich") (*Log*, 9: 104). The predicate concept narrows the comprehension of the subject's concept in a negative judgment, but in an infinite judgment, there is no concept of the predicate to do the same; "*non-c*" is not associated with a concept at all. What we need is to find a concept to do this job. The diagram of Figure 2 expresses that there is an intermediate *b* such that "All *a* are *b*" and "No *b* is *c*", and applying to them CELARENT, it follows that "No *a* is *c*."

What is at stake is a Principle of Excluded Middle for Terms (see Alchourrón, 1981). If S is a first-order predicate that stands for the subject *a*, P is a first-order predicate that stands for the predicate *c*, and $\underline{P}$ is a first-order predicate that stands for *non-c*, then "All *a* are *non-c*" is formalized as $\forall x\ (Sx \supset \underline{P}x)$ and "No *a* is *c*" is formalized as $\forall x\ (Sx \supset \neg Px)$. The following instance of the Principle of Excluded Middle for Terms is required to show the equivalence between these two formulas: $\forall x\ (\underline{P}x \equiv \neg Px)$. Each side of the proof of equivalence uses half of the Principle of Excluded Middle for Terms and BARBARA.

Another way to impose the equivalence between the two judgments is to specify a universe of discourse. And the simplest way to determine a universe of discourse is exemplified in Lewis Carroll's treatment of syllogistic with negative terms. If we allow negative terms, we can have six different, but not wholly unrelated terms in a syllogism. To fix a universe of discourse, Lewis Carroll (1977, p. 107) imposes the following condition: “All their six Terms are Species of the same Genus, (…) the Genus, of which each of the six terms is a Species, is called **Universe of Discourse**, (…).”

4. Diagrammatic autarchy (Castro-Manzano and Reyes-Cárdenas, 2019, pp. 13-14)

Castro-Manzano and Reyes-Cárdenas use the attributes proposed by Nakatsu (2010, p. 305) to evaluate the representational quality of the Kant-Jäsche logic diagrams, namely, comprehension, clarity, parsimony, relevance, and separability. Except for the last attribute, the others converge to the same point: the Kant-Jäsche logic diagrams operate very well at the judicative level, adequately revealing the internal structure of the judgments, but they do not work well at the inferential level.

The discussion can be shortened by replacing the first four attributes with the Leibnizian notion of autarchy. Leibniz (*apud* Bellucci *et al.*, 2014, p. 23) stated that “One must know that characters are most perfect the more they are *autarchic*, in such a way that all the consequences can be derived from them.” This same point of view about the symbolic character of science is expressed by Heinrich Hertz, in *Principles of Mechanics* (1894): “We make ‘inner fictions or symbols’ of outward objects, and these symbols are so constituted that the necessary logical consequences of the image are always images of the necessary natural consequences of the imaged objects.” (Hertz, *apud* Cassirer, 1955, p. 75). The critical evaluation, regarding the first four attributes, can be concisely expressed as follows: because the Kant-Jäsche logic diagrams operate properly only with immediate rules (rules for pairs of categorical propositions), they do not present full diagrammatic autarchy.

5. Comparison with Venn diagrams (Castro-Manzano and Reyes-Cárdenas, 2019, pp. 14-16)

Castro-Manzano and Reyes-Cárdenas use the notion of informationally equivalent (logical systems), by Larkin and Simon (1987), to compare Kant-Jäsche logic diagrams with Venn diagrams. Two logical systems are informationally equivalent if all information inferable from one is also inferable from the other, and vice versa.

They prove that there is information inferable by Venn diagrams but not inferable by Kant-Jäsche diagrams, by proving that the validity of DARII is demonstrable by Venn diagrams, but not by Kant-Jäsche diagrams. This is sufficient to prove that the two diagrammatic systems are not informationally equivalent. But the reverse is also true. Namely, there is information inferable by Kant-Jäsche diagrams that is not inferable by Venn diagrams. That is, they are incomparable diagrammatic systems. This incomparability merely results from the different treatments given to particular statements. Kant-Jäsche diagrams cannot validate DARII is not a deficiency but follows from the Kantian interpretation of the particular statements. Let "$\text{Some}_{\text{VENN}}$ *a* is *b*" and "Some_{KJ} *a* is *b*" be, respectively, the non-accidental and the accidental interpretation of the particular statement "Some *a* is *b*." The premises of DARII, in the Kantian interpretation, are "All *b* are *c*" and "Some_{KJ} *a* is *b*", and from them, we can only conclude "$\text{Some}_{\text{VENN}}$ *a* is *c*."

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Estudo crítico recebido em: 31.07.2020

Estudo crítico aprovado em: 03.09.2020