# Wittgenstein's Picture-Investigations

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**Abstract.** This paper reports on Wittgenstein's use of pictures and diagrams undertaken through an analysis of the surrounding co-text in the published works. It is part of a larger project to develop tools for the integrated semantic analysis of images and text in Wittgenstein's original manuscript and typescript sources. The textual analysis took keywords, phrases and punctuation as possible indicators of definitive samples and rules in propositions and non-propositions. For reasons argued in the paper we focused on non-propositions and differentiated those that functioned descriptively from those that functioned definitively. Finally, from the range of definitive statements we investigated those that functioned according to Wittgenstein's concept of a rule. In all cases we focused on collocation of indicative text with images. We concluded that Wittgenstein's practice accorded with his early statements about images needing accompanying words to activate their propositional status, but that images could function independently as non-propositional descriptive or definitive samples. As definitive samples, many images also had the capability to function as rules, or independently as proofs. Since the picture-sentences rely on iconicity to communicate rules that may otherwise he hidden in our language practice, we speculate that the iconic relationship may belong to hinge epistemology. This is proposed as a strand for future research.

**Keywords:** Wittgenstein, corpus analysis, picturing, propositions, rules, semantics.

## 1 Introduction

This paper describes a survey of the use of images in Wittgenstein's published works and is part of a feasibility study for the development of a semantic tool with which to investigate the range of meaning and use of literal pictures in the digital corpus of Wittgenstein's manuscripts known as the Bergen Nachlass Edition[1], and

[1] Wittgenstein, L. (2015-). Bergen Nachlass Edition. Edited by the Wittgenstein Archives at the University of Bergen under the direction of Alois Pichler. In: Wittgenstein Source, curated by Alois Pichler (2009–) and Joseph Wang-Kathrein (2020–). http://www.wittgensteinsource.org

how that might be integrated with more established text-based tools. As an initial interpretative tool, corpus analysis attempts to complement any deficits in existing semantic information by offering collocation analysis, etc., i.e., syntactic and pragmatic tools rather than semantic tools. In the case of image-rich texts such as Wittgenstein's, there is a stage at which the interpretative analyses of the texts need to be integrated with analyses of the images, establishing any mutual relationships and the impact they have on semantic interpretation. Previous studies of Wittgenstein's use of images and diagrams have focused on their semantic contribution to the co-text. However, the images also contribute to, and impact on, the syntax of the sentences in which they occur. In particular, we note that Wittgenstein warns us that neither words nor pictures make sense on their own but require a context of practice in which they have meaning (PI-I §23) We therefore undertook a pilot study to see how propositions and non-propositions, rules and proofs, were functioning when they contained literal pictures. We claim that such picture-sentence investigations are distinct from previous text-image interpretations because the latter have overlooked the difference between an image that illustrates what is said in the surrounding text, and an image that functions syntactically as part of a sentence. The current revision of the Bergen Nachlass Edition and the Wittgenstein Ontology Explorer that is under development, offer a platform in which the outcomes can be implemented as tools for complex text-image analysis[2].

### 1.1 The Presence of Literal Pictures

There are about 500 images in the published works, which were mostly produced posthumously from a collection of handwritten and typewritten documents known as Wittgenstein's Nachlass. There are 2000-3000 images in the Nachlass, depending on how one counts them, although this figure is somewhat misleading because the contents are quite repetitive owing to their status as preparatory studies and reworkings of what is now well known through the edited published works. In the digital publications, many image files are generated as a response to problems of notational representation rather than being intrinsically pictorial or diagrammatic. The presence of literal pictures causes presentational problems for anyone involved in publishing these texts, and they cause search problems in the digital environment owing to the different file types[3].

### 1.2 The Function of Images

Given that images are rare in works of philosophy, a relevant question is "what is the function of these images"; for example, what do they contribute to the text, and what do they contribute that would be missing if, like most philosophical writings, they were not there? By approaching the problem from this novel angle, i.e., what would be missing if they were not there, we could separate many of the larger, eye-

[2] http://wab.uib.no/sfb/

[3] Owing to the different copyright rules and permissions for images and text, it has been necessary to either redraw or use the scanned manuscript images for this paper.

catching images such as the duck-rabbit because they sit between sentences and show or illustrate what is said in the text. We call these inter-sentential images. This contrasts with many of the smaller, more easily overlooked images that lie within a sentence and if they were to be removed the sentence would no longer make any sense. We call these intra-sentential images. This highlighting of intra-sentential images pointed us towards the possibility of using text analysis tools and methods that might reveal the function of these literal pictures in picture-sentences. We acknowledge that it is still the case that the interpretation of Wittgenstein's use of images in his writings needs to be undertaken in context, but it does provide a syntactic view of that use in addition to the semantic view that has been undertaken previously by researchers.

### 1.3 Propositions, Non-propositions and Pictures

When Wittgenstein says that a proposition is a picture, the term "picture" refers to an underlying model *[Bild]* theory of representation in which language functions like a picture because it shares the morphology of what it represents. This is a very restricted correspondence theory of language, but it perhaps served Wittgenstein's early purpose to focus on a specific class of language acts, i.e., propositions. In TLP[4], an early work, Wittgenstein develops a sophisticated model of this language-world relationship that shows propositions to be either true or false. The model-theory gave rise to what has become known as his "picture theory of meaning" (cf. TLP §§2.16-2.2). The picture theory of meaning is not a theory of how pictures convey meaning (cf. Mitchell, 1986, p. 20), but rather it is a theory of how language conveys meaning based on a comparison with how pictures convey meaning. In TLP, Wittgenstein approaches this issue from a structural point of view, identifying that there needs to be a correspondence between the logical dimensions of the representation and what it represents, and there is little mention of the appearance or iconicity of the picture itself.

Anscombe, in her introduction to TLP, objects that a picture cannot function on its own as a proposition because it cannot assert that the things depicted can actually be found somewhere in the world (Anscombe, 1959, p. 64). Anscombe's objection is that a picture is truth-functionally neutral because it belongs to a non-shared language that simply resembles a state of affairs rather than asserting "this is how things are in the world". The issue for us here is whether a picture can "say" (assert) anything, and if so, in what sense? Shier proposes that this difficulty can only be resolved within the constructs of TLP and the early picture theory by adding something external to the picture, e.g., by adding "some account of what we do with pictures" (Shier, 1997, p. 73). Gregory also adopts a similarly Fregeian reservation about the ability of pictures to be propositions, "given that the notion of a proposition has its natural home in thought about language" (Gregory 2020, 155). He thinks that it is "a little odd" to talk about the truth conditions of pictures, and it is perhaps better to speak of their accuracy-conditions i.e., that the depiction can be seen in this way from this

[4] Tractatus Logico-Philosophicus, translated by Ogden and Ramsey (1922)

viewpoint (2020, p. 157). We regarded the implication that images rely on the surrounding co-text in order to function as propositions, as an indicator of a strong thesis that integrated text-image tools are necessary for the semantic analysis of Wittgenstein's published works and the broader Nachlass.

In the middle period, especially in the early 1930s, the number of literal pictures in Wittgenstein's writings increases, and his focus shifts to the difference between propositions and non-propositions. Propositions are important in philosophy because they tell us something about the world, and for this reason they can be either true or false. On the other hand, non-propositions are neither true nor false, but instead make a statement about the language game in which they occur. Such statements are often grammatical rules about how words or practices are to be used rather than moves within the practice itself. However, in the example of correctly counting 2+2=4, the implied proposition "it is asserted that 2+2=4 is the case" does not tell us something intrinsic about numbers but does tell us about our practice and what we do or do not describe as correctly counting (cf. PI-I §22[5]). Wittgenstein would call this a pseudo-proposition because one cannot imagine it to be otherwise (PG[6] p.129) and claims that rather than telling us about the world it tells us about the rules or grammar of our language-game of counting, i.e., the correct use of words or "operating with signs" (BBB[7] p.6) rather than about the fundamentals of logic and arithmetic. In discussing picture-sentences, we might therefore need to differentiate between propositions and non-propositions, and then consider what can be said about the contribution of literal pictures in each case.

### 1.4 Problem Statement and Present Aims

We have discussed that the early Wittgenstein has a variable but sustained concept of the proposition as a picture or model of the world. This is sometimes expressed as the assertion "the proposition is a picture." Sometimes such claims are accompanied by literal pictures that may occur between sentences (inter-sentential) or within a sentence (intra-sentential). According to Frege and Anscombe, images cannot "say" anything in isolation from the co-text, and this context-dependent semantics is the way in which they have hitherto been analyzed. However, it seemed to us that the claim that what an image "says-shows" is context dependent, is altered depending on whether one is considering inter- or intra-sentential images. The alteration arises because the inter-sentential context of the former affects the interpretation of the image whereas the intra-sentential context of the latter affects the interpretation of the text. Furthermore, what the picture-sentence "says-shows" in the case of a proposition is different from what the picture-sentence "says-shows" in the case of a non-proposition. In the former the sentence makes an assertion which may or may not be true, whereas in the latter we have a description of how the language game is to be

[5] Philosophical Investigations (1953)
[6] Philosophical Grammar (1974)
[7] Blue and Brown Books, second edition (1969)

played. Such non-propositional picture-sentences may be demonstrations or proofs, for example.

Undertaking an analysis of the distribution and function of images in these cases will shed light on both Wittgenstein's practice, and on the instrumentality of the images in relation to the concepts in the texts, i.e., semantic categories that have been developed independently for words and images may need to be harmonized. In addition to contributing to Wittgenstein scholarship, such insights will also contribute to the presentation of Wittgenstein's works by providing a decision-making tool for the representation of images by normalized types, e.g., Unicode. It will also contribute to the design of integrated image-text search and content analysis tools such as Wittgenstein Source (image-text representation) and the Wittgenstein Ontology Explorer (image-text search and semantic analysis). We believe such tools are necessary to facilitate scholarly exploration and discussion of Wittgenstein's "picture-investigations" advocated by Baker (2001, p. 21).

## 2 Method

We have used tools from corpus linguistics, semiotic analysis, and textual analysis, to locate and interpret instances of intra-sentential literal pictures that may relate to the concepts of propositions, rules, and hinges. The corpus assumed to be "Wittgenstein's published works" consisted of 14 books in digital format by Intelex[8] plus a digitized copy of TLP1922. This c.925,000-word corpus was encoded so that the images became locatable within the texts, and parsed for examples of image-text collocations, and syntactic forms indicated by punctuation. These examples were then used to inform our hypotheses and proposals for further study.

In terms of images, there are 409 instances in the corpus according to the strict definition of Biggs and Pichler (1993, p. 92). However, according to their criteria, a number of significant works are omitted from the corpus because they do not have an origin in Wittgenstein's Nachlass, i.e., a manuscript source for the publications in Wittgenstein's own handwriting, e.g., BBB. Since it is also discretionary whether some series of images are counted as one image or several, it is safer to make the more general claim that there are c.400 images in the corpus. We therefore adopted the approach that the statistics in this paper are indicative rather than definitive, since the boundaries and conditions of the quantitative analysis are insufficiently rigid. However, our method could generate quantitative data if there were to be consensus about the scope of the sample. Since the present study reports on a pilot for a larger study of the Nachlass, the issue of scope is not critical at this stage.

Given the focus of the present conference on diagrams as a specific form of visual communication, we need to defend our use of the terms image, picture and diagram. We have adopted a technical use of both image and picture. An image is taken to be anything non-textual, i.e., that is not part of the Unicode basic multilingual plane (0000-04FF) and therefore needs to be represented via an image file-type. Although

[8] BBB, CV, LW1&2, NB, OC, PG, PI, PR, RFM, ROC, RPP1&2, Z

Unicode can be used to construct quite complex forms, we avoid using it “creatively” or combinatorially, e.g., by using box drawing elements. Adopting this approach results in some mathematical and musical notation being classified as images, owing solely to presentational issues, and overlooking some tabular layouts of letters that are functioning diagrammatically (e.g., PG p.328). Where necessary we note such cases. We follow Wittgenstein’s occasional use of the term “picture”, for example in “picture-face” (PI-II p.194) if the iconicity of the image is relevant for the co-text. Following Giardino and Greenberg (2015) we agree on some pragmatic differences between picture and diagram, in that pictures imply a viewpoint whereas diagrams do not, and diagrams tend to require text whereas pictures do not. We also found a linguistic difference between the adjective “pictorial” which suggested iconic resemblance, and “diagrammatic” which suggested something with more of a structural resemblance. However, owing to the very sketchy quality of Wittgenstein's images, and the almost universal requirement that the signification of Wittgenstein's images need to be clarified by the text, not least owing to the context of philosophical discussion, neither of these differentiations is very reliable.

We use the terms “picture-sentence” and “intra-sentential” to describe a sentence in which an image occurs, in contrast to the term “inter-sentential” to describe an image that occurs after a full-stop (actual or implied) and before an initial capital letter.[9] Finally, on this issue of “location”, it should be noted that Wittgenstein frequently draws his images on a new line and then starts the text again after another line-break. However, although these look like “inter-paragraph” images, and are frequently represented as such in the published works, we gave sentence punctuation priority over page layout. We therefore adopted a structural encoding of the corpus, and our descriptions of inter- and intra-sentential images relates to structural rather than presentational features, i.e., intra-sentential images were regarded as part of a continuous line of text. We differentiated two classes of sentence: propositions, non-propositions; and two classes of image-text collocation: inter-sentential and intra-sentential. In response to the objections implied by Anscombe (above) we focused on intra-sentential images, although we comment on some inter-sentential examples where they seem to shed light on Wittgenstein’s use of images. We were interested in three functions within the class of non-propositions: examples, rules and proofs. In other words, our investigation could not be undertaken simply using corpus analysis tools because it involved the interpretation of what Wittgenstein had written in terms of his philosophy.

We hypothesized that Wittgenstein’s use of quotation marks in connection with diagrams was probably indicative of assertion, i.e., propositional content, and demonstration, i.e., non-propositional samples, respectively. Terms such as "thus:", "like this:", and "example"; we regarded as possibly indicative of description by example, but also as possibly indicating a notation for ostensive definition. We

[9] This may seem like a rather laborious description of a sentence, but in manuscripts one often encounters orthographic errors in which sentences are not “properly” concluded by a full stop or begun by an initial capital. Wittgenstein rarely puts a full stop after an image at the end of a sentence. Sentence termini may need to be inferred.

associated the words "rule" and "proof" with our textual searches for images that may be acting as rules.

We experimented with various indicators of the way in which the text-diagram collocation may be functioning in the corpus. We first divided the total corpus images (n=409) between inter- (n=122, 30%) and intra-sentential cases (n=287, 70%). We then searched the intra-sentential cases for collocation of the images with keywords that might indicate the sentential functions of examples, including the term "example"[10], the abbreviation "e.g." and the word-punctuation collocation "thus:". We hypothesized that certain punctuation, such as the colon, was instrumental in creating a syntactic role for an image as a word-substitute. We also used contextual reading to identify intra-sentential uses in connection with rules and proofs. In order to focus on the active role played by the images we also searched using Wittgenstein's term "perspicuous representation" and its cognates, together with "surveyability, synoptic view, bird's-eye view" in accordance with the translator's note by Rush Rhees in PR[11]. These were by no means comprehensive search terms but provided a basic set to test the utility of the approach. Finally, further segmented cases between images that arose owing to presentational complexities of representing the notation in the text, e.g., conventional musical or mathematical notation, from images that were essentially pictorial or diagrammatic, or creatively "misused" notational conventions.

### 2.1 Discussion

Broadly speaking, we took a proposition to be a subset of sentences which make claims that are either true or false. This is a technical description adopted by Wittgenstein in his very earliest notebooks. Whether it is feasible to determine the truth or falsehood of a proposition is irrelevant to making the classification. On this basis it is clear that many well-formed sentences should not be called propositions, a point not always observed by translators. Nonetheless, propositions are normally of special interest in philosophy because they tell us something new about the world. One of the novelties of the present research is that we focus on non-propositions because they may describe our practices, and Wittgenstein's use of images in non-propositions may be related to his therapeutic method of showing us a way out of our linguistic entrapment.

By the middle period of Wittgenstein's philosophical development, in the 1930s, he was focusing on a form of non-propositional sentence that he sometimes called a "rule". Such sentences tell us about how words and concepts should be used within a

[10] It should be noted that this initial research was conducted on a digital text of the published works in English (Intelex 2000). To this collection was added a digital version of TLP (1961). Most of the original manuscripts in the Nachlass are written in German. Where there are known to be special difficulties owing to translation, we will include a brief discussion of the impact of the issue on the current research. The published works were selected in preference to the Nachlass for reasons of textual determinacy and feasibility. At the time of writing, we did not have access to a digital corpus of the published works in German.

[11] Philosophical Remarks (1975)

language game. Some of these rules sound as though they are making claims about the external world, but this is misleading. An example of a rule would be “an object cannot be red and green at the same time”. This sounds like a proposition that could be tested in practice and might involve a search for a simultaneously red-and-green object. However, Wittgenstein would regard this was a waste of time because the statement that “an object cannot be red and green at the same time” tells us about how we use colour words and concepts rather than telling us about phenomena. It belongs to the grammar of our concepts that we cannot use the words red and green in this way. The possibility of making a well-formed, grammatical sentence encourages us to view it as a proposition, but this possibility is misleading and reinforces why, in the present research, it is not sufficient to simply employ corpus analysis tools independently from an understanding of the philosophical text to which they are being applied.

Wittgenstein’s rules function like the rules of the game of chess. Rules are discretionary, in the sense that although they are arbitrary, having been established they are non-negotiable. If I do not follow the rules of the game of chess, then I am not playing chess but some other game. The rules of chess lie outside the game itself and form a framework within which the game is played. It is equally so with language; the rules and grammar of language determine how one goes about using the language; grammar in this case meaning conceptual grammar rather than English grammar. Using the words red and green within the language game of English involves the rule that red excludes green even though there is no corresponding rule that not-red implies green. Rules, according to Wittgenstein, are “nonsense”, not because they are useless but because they do not tell us anything meaningful within the language game, i.e., they are not propositions.

## 3 Case studies

The intra-sentential images were analyzed in a variety of ways as discussed above, differentiated by collocations of words and punctuation. In the following sub-sections, we discuss some paradigmatic cases of intra-sentential images collocated with text matching these criteria. These cases therefore serve only as examples, and we do not claim that these are the best or only cases.

### 3.1 Propositions as Pictures and Pictures as Propositions

The familiar claim that a proposition is a picture is mainly found in Wittgenstein’s early work (e.g., TLP§4.01). However, we wanted to examine the concept from the point of view of the picture, i.e., whether a picture is a proposition. The high frequency lemmas “pict*” (n=1949) and “proposit*” (n=3911) were searched for collocation with one another within the span R5 (n=53), and further refined as the 2-gram assertion “the/a proposition is... picture (n=18)”, “proposition as... picture” (n=1). There was one assertion that “the picture can serve as a proposition” (NB p33), and one of inference “I have… in a picture in front of me; then this enables me to

form a proposition, which I as it were read off from this picture" (RFM-IV §49 p.249). Finally, there was one explicit statement about the picture as proposition:

> Can one negate a picture? No. And in this lies the difference between picture and proposition. The picture can serve as a proposition. But in that case something gets added to it which brings it about that now it says something. In short: I can only deny that the picture is right, but the picture I cannot deny" (NB p.33).

An alternative possibility, of the neutral picture as a "proposition-radical", occurs in PI-§22 and, similar to the example in NB[12] p.7, describes a picture that depicts people. The textual context, including the notation of enclosing the picture in quotation marks, seems to reinforce his early view influenced by Frege that the surrounding textual cues are part of transforming the proposition-neutral picture into an assertion. A further possibility "between picture and proposition" occurs in a context discussing negation and whether one can negate a picture (cf. NB p.33 above, no image). Both alternative possibilities reflect Frege's theory that an image can only communicate when it is supplemented by words. The picture itself says nothing and needs to be contextualized and turned into a proposition. However, a semantic interpretation of the contribution made by the image to the meaning of the sentence already requires that the sentence is seen-as a proposition. We therefore attributed some agency to the role that the quotation marks have in turning the picture-sentence into a proposition, and we added this syntactic indicator to our search list but noted that it was serving only to clarify that the sentence may be functioning as a proposition and not what was being claimed by that proposition. This is the inherent semantic ambiguity, according to Wittgenstein, of each picture-proposition, e.g., the stance of the fencer (NB p.7) and the stance of the boxer (PI-§22, no image): that there is some content, for example an internal relationship, that is the content of the image but that its external relationships or the assertion that is made about the state of affairs in the picture, is ambiguous.

### 3.2 Images within Quotation Marks (picture-assertions)

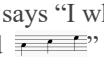
Wittgenstein frequently introduces an interlocutor into his texts. The interlocutor is the voice that asks difficult questions or puts forward an expected response that Wittgenstein wishes to refute. The interlocutor's comments are frequently enclosed within quotation marks, and even when there are no other indicators, the reader soon learns to expect that she should disagree with the stance the interlocutor is taking. Therefore, there is a high frequency of the occurrence of quotation marks in the corpus as a whole (n>13,000 pairs).

There are only 12 instances of images immediately enclosed within quotation marks. This includes a set of four symbols that is repeated in two places (PG p.188 & PI §495). There are an additional 7 images in ≤5-gram lexical phrases within quotation marks. Of most interest, owing to what is said in the collocated text, are the

[12] Notebooks 1914-1916, second edition (1979)

cases of the stick-men (NB p.7 mentioned above), the musical example (BBB p.84), the cartographic sign (RPP-I p.42) and the case of "seeing-as" (PI-II p.206).

The musical example (BBB p.84) is a somewhat marginal case because the image is only necessary to present musical notation, and it is part of a phrase that is encompassed in the quotation marks[13].

> Compare these cases: a) Someone says "I whistled..." (whistling a tune); b) Someone writes, "I whistled  "

However, it represents an interesting contrast between an action and the notation for that action. The image itself, is taking a role that would normally be fulfilled by the written word. To that extent it is not especially interesting. On the other hand, the voice of person a) says the words "I whistled" and then whistles (action). This is converted into notation in which the words are written but the whistling remains as a description of the action instead of being annotated in musical notation. This is contrasted with the voice of person b) who also says the words "I whistled" and then whistles, but this is converted into notation in which the words are written, and the whistling is annotated in musical notation. The difference between a) and b) is clarified by the use of quotation marks, because the action is the same whereas the annotation is different. This example occurs in a textual context within BBB in which Wittgenstein is drawing attention to the way in which there are many different ways of representing or annotating an action and furthermore many different ways of interpreting and acting upon that interpretation.

The cartographic sign "⌂" enclosed in quotation marks (RPP-I p.42) serves a similar function[14]. The textual context discusses whether there is a significant difference between the sign for a house on a map, and the house itself, and whether the house could stand as a sign for itself if it could be put on a map. As with the musical example, this is an issue regarding the relationship of a thing to the notation or representation of that thing; representations that include the spoken word, the written word, drawings, etc. It is possible that the function of the quotation marks is to make the whole phrase into an assertion or proposition of the form "there is a ⌂ here".

The stick-men "" enclosed in quotation marks (NB p.7) also seem to be acting as an assertion or proposition. The preceding text explicitly states that "actual pictures of situations can be right and wrong". The subsequent text also states that "the proposition in picture-writing can be true and false". The content in this case is that the image acts as a proto-proposition and has content independent of its truth or falsehood. We do not believe this image is acting as a definition. The term "assert" is here used to claim the semantic content of the image, owing to some iconicity, is that "A is fencing with B". An example of a definitive version of a similar situation would be the sculpture Discobolus by Myron. There was a time when this sculpture was regarded as definitive of how to stand and throw the discus.

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[13] As a result, we here use a normalised (typographic) representation of the image.

[14] This is stated as a conventional sign which we represent with a normalised typographic symbol.

The "seeing-as" picture-sentence "I see  as  " (PI p.206) has a structure similar to the musical example, except that there is a notational problem that is resolved twice over by the inclusion of an image. In the musical example there was a contrast between the musical sound itself and music-as-notation. In the seeing-as example there are two forms of notation, the first of a triangle, the second of an arrow, both functioning as images of a direction (towards the bottom right). As is the case with the musical notation, the broader textual context is about the complexity of the way in which we both annotate and interpret actions and objects, and the way in which one might be blind to alternative aspects and uses, such as seeing the triangle as pointing towards the bottom left.

We concluded that the enclosure of an image within quotation marks implies that the image is acting as a proposition by making an assertion that may be true or false. However, in the early image of the stick-men there is an ambiguity regarding what is being asserted; whether the men are fencing, or demonstrating a stance in fencing, etc. On the other hand, the later image of seeing-as consists in whether an image can be interpreted in one way or another in the sense that the aspect that is seen is demonstrated by the way in which someone acts in relation to the image. The assertion "I see x as y" asserts the aspect even if that aspect is surprising.

### 3.3 Images Collocated with "example, thus:, like this:" (picture-samples)

As one might expect, pictures frequently occur as illustrations of what has been said in the text, in other words, as examples. Searches were made for combinations of intra-sentential images with the term "example:" (n=963, collocation n=5), "e.g.:" (n=888, collocated n=5) and constructions "like this:" (n=471, collocated n=31), and "thus:" (n=465, collocated n=9).

The most discussed image in the secondary literature of this kind is the "eye/visual field" image at NB p.80. The image is collocated with "like this:" and has been critiqued by Bazzocchi (2013) in terms of its graphical appearance in published texts but not in terms of its propositional or rule functionality.

> The visual field has not, e.g., a form like this: 
> (NB p.80, cf. also TLP §5.6331)

For our purposes, the syntax "like this:" suggests its use as a descriptive sample. Bazzocchi argues from this point too, that the importance and the common misrepresentation is to show the eye within the visual field instead of completely outside it. There are several occurrences of the form "is it not like this", but there are no cases of picture sentences that show how things "do not stand". Indeed, at Z[15] §249: Wittgenstein's interlocutor has quite a dialogue with herself about an un-picturable "four-dimensional cube". In the published work an image has been added by the editors, but in the original manuscript Wittgenstein simply inserted a row of dots "……". At Z §699, Wittgenstein experiments with another boundary case of

[15] Zettel, second edition (1981)

number representation, by writing the recurring decimals of *pi* on top of one another (repeated at RPP-I p.66).

To summarize: descriptive samples can be used to demonstrate both what can and what cannot be represented by images. This cannot be said of definitive images because they cannot be negative in isolation, i.e., denying the form they describe, as is the case at NB p.80 above. Examples of definitive samples include instruction tables at BBB pp.123f. and the use of novel ciphers such as  used as a sign for the smell of coffee (RPP-I p.103, and one of the 5-gram lexical phrases within quotation marks). What differentiates definitive from descriptive samples is that it makes no sense to deny the assertion of the definition because it is functioning as a rule within a particular language game (PG p.129). As a result, we concluded that images in propositions acted as descriptive samples owing to them also being assertions of a state of affairs whereas non-propositions were probably acting as definitive samples or, conversely, the presence of images in some non-propositions caused them to be definitive samples.

### 3.4 Images Collocated with "Rule" (picture-rules)

The concept of non-propositions as rules of our grammar of concepts occurs principally in texts from the 1930s ("rule*" n>1000). We comment on just a small number of examples of "rule" collocated with an image. Three examples (PG pp.98, 202, 203) make the connection between intention and following a rule. The issue at stake in these remarks is how or under what [additional] conditions would one say someone was following a rule. Such additional requirements do not remove the difficulty, e.g., RFM[16]-VI §29 p.330 on rule-following and how to go on:

> When I have been taught the rule of repeating the ornament  and now I have been told "Go on like that": how do I know what I have to do the next time? (RFM-VI §29 p.330)

Sometimes, despite following a rule/prediction, the outcome results in surprise, suggesting that the outcome is obscured in the form of the notation, i.e., is not perspicuous:

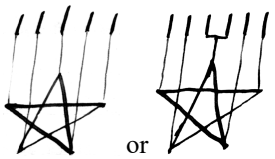
> Before I have followed the two arrows  like this  , I don't know how the route or the result will look. I do not know what face I shall see… But why wasn't this a genuine prediction: "If you follow the rule, you will produce this"? Whereas the following is certainly a genuine prediction: "If you follow the rule as best you can, you will..." The answer is: the first is not a prediction because I might also have said: "If you follow the rule, you must produce this." It is not a prediction if the concept of following the rule is so determined, that the result is the criterion for whether the rule was followed. (RFM p.316f.)

[16] Remarks on the Foundations of Mathematics, third edition (1978)

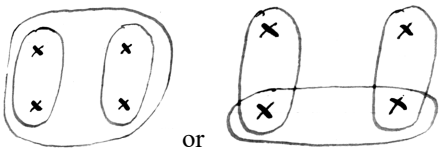
We concluded that picture-rules were closely related to practices and embodied them as memorable representations of those practices through iconicity. The image reveals what is either hidden or only implied by the textual "rule", e.g., assumptions about adding and not counting any elements twice, and in particular that rules that we recognize as such, e.g., lexical rules, can be misconstrued in a wide range of often surprising ways. The surprise seems to come from aspect-blindness that the rule could be misinterpreted in the way that the image reveals. This seems to be related to the very fundamental nature of the rules under discussion, e.g., of basic arithmetic, which we erroneously believe have only one aspect and one way of following the rule.

### 3.5 Images Collocated with "proof" (picture-proofs as picture-acts).

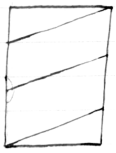
We initially interpreted the collocation of the term "proof" with an image as an assertion of the possibility of the image as a paradigmatic sample, i.e., the same as a picture-rule. The concept of an image as a proof is absent from the early works but is widely distributed in Wittgenstein's middle period. It arises typically in connection with mathematical proof or foundational concepts in arithmetic. The most explicit example is the correlation of five strokes, known as a hand, with the five points of a star as paradigmatic of counting the number of points on the star (RFM-I §40 p.53). Wittgenstein introduces the aspect of a correct correspondence of the hand to the star in contrast with an incorrect one.

 or (RFM-I §25 p.47 & §40 p.53)

There is also the mapping of one star onto another which epitomizes the apparently obvious 1:1 relationship (RFM-I §41 p.54). These are contrasted with the graphical demonstration of an alternative way of seeing the aspect of counting:

 or (RFM-I §38 p.52)

These images show that there is more than one possible procedure but that only one procedure is regarded as correct. This reveals the first example to be a rule. Therefore, following our initial assumption that the term "proof" indicated a paradigmatic case of the image as a sample, we revisited it as a possible indicator of an image as a rule. RFM-I §50 p.57 offers the clearest case owing to the syntax of the accompanying text:

> A rectangle can be made of two parallelograms and two triangles.
> Proof:
>
> 
>
> A child would find it difficult to hit on the composition of a rectangle with these parts, and would be surprised by the fact that two sides of the parallelograms make a straight line, when the parallelograms are, after all, askew. (RFM-I §50 p.57)

What we mean by a proof in this context is that it shows that it can be done, whereas a rule legitimizes one of the possible practices. The rectangle is the surprising result of a physical procedure of rearranging two parallelograms and two triangles. A movie that followed the actions of somebody rearranging paper triangles and parallelograms would perhaps be more convincing. The key point is that there is a practice that embodies the meaning of "a rectangle can be made of…" In this sentence the word "made" reinforces the idea that there is a constructive practice that could be undertaken or observed.

We concluded that "proofs" were often being used as antitheses to "rules", where a diagrammatic proof embodied an alternative, surprising, or scarcely credible case of rule-following. Diagrammatic proofs can therefore be demonstrations, i.e., speech-acts. Proofs could be said to be diagram-acts or picture-acts.

## 4 Conclusions and future research

If one could identify examples of pictures as propositions, it would provide a new or alternative critical framework for the discussion of the so-called picture theory, i.e., one might propose a language theory of pictures rather than a picture theory of language. Similarly, if one could identify cases of non-propositional pictures as rules it would give a new tool for discriminating when sentences that appear to be propositions are not acting as propositions, i.e., what are the syntactic indicators of rules in the textual context and how are these modified or supplemented in the diagrammatic context. Finally, the concept of "hinge epistemology" may or may not be illuminated by consideration of whether non-textual elements might also function in this foundational way, i.e., it might be symptomatic of what we call a *picture-hinge* that few image theorists have been able to describe the way in which an iconic image resembles its subject[17]. Our conclusions consist of two main claims, the first regarding the non-possibility of pictures as propositions, the second regarding the possibility of

[17] For an excellent survey of this problem see Hyman and Bantinaki "Depiction". In: Zalta, E.N. (ed.), (2021) *The Stanford Encyclopaedia of Philosophy* https://plato.stanford.edu/archives/sum2021/entries/depiction/

picture-sentences as rules; followed by a proposal for future research into picture-hinges.

### 4.1 Picture-sentences as Propositions

In 1942, in the late period, Wittgenstein writes explicitly that “a proposition describes a picture”, accompanied by an image (RFM-IV §2 p.223). We take this to mean that behind the proposition is a practice that gives it meaning. In agreement with Frege, the picture alone is not acting as a proposition: the picture is a proposition-radical. Pictures can be asserted, as sometimes indicated by quotation marks, but a co-text is required to clarify a *picture-sentence* as a proposition. We are skeptical that any of the picture-sentences meet Wittgenstein's [variable] requirements for a proposition, but we do claim that the images in picture-sentences are doing useful work as *descriptive samples*.

### 4.2 Picture-sentences as Rules

Many of Wittgenstein’s picture-sentences are non-propositions. Some are *definitive samples,* and a subset of those are functioning as rules (§3.4). We found the highest frequency of images occurred during the middle period, especially in conjunction with the discussion of rules. The notions of proof and of convincing procedures were textual markers of picture-sentences that functioned as conceptual grammar and therefore as non-propositions. Images collocated with such textual elements revealed underlying practices, principally on the theme of the foundations of arithmetic. We suggested that proofs could be regarded as visual equivalents to speech-acts, which we called *picture-acts*. *Picture-rules* and *picture-proofs* were used to reveal correct and incorrect practices by virtue of having iconic relationships with concepts, i.e., the images critiqued the textual representation which obscured the practices. This ability to show rather than to say belongs to the iconicity of the images, as mentioned in §2, however, the iconic relationship remains ineffable, i.e., the resemblance problem in depiction. We speculated that its ineffability may be a consequence of its foundational relationship of the type described in Wittgenstein's final writings on certainty, as “hinges”, for example:

> And if it were not like this the ground would be cut away from under the whole proof. For we decide to use the proof-picture instead of correlating the groups; we do not correlate them, but instead compare the groups with those of the proof (in which indeed two groups are correlated with one another). (RFM-I §31 p.49 referring back to the hand and star correlation mentioned above).

### 4.3 Future Research: the potential for pictures as hinges

Picture-rules, and conventionalized picture-acts, are epistemic and part of our conceptual understanding. Hinges, on the other hand, are incontestable and are non-epistemic.

> the mathematical proposition has, as it were officially, been given the stamp of incontestability. I.e.: "Dispute about other things; this is immovable--it is a hinge on which your dispute can turn." (OC§655).

Hinge certainty (e.g. that an arrow points, that white is lighter than black) is more fundamental than merely seeing an aspect, which is merely particular to my pathology. Moyal-Sharrock (2021, p. 140) lists the characteristics of hinges as:

> (1) non-epistemic: they are not known; not justified (2) indubitable: doubt and mistake are logically meaningless as regards them (3) foundational: they are the unfounded foundation of thought (4) non-empirical: they are not conclusions derived from experience (5) grammatical: they are rules of grammar (6) non-propositional: they are not propositions (7) ineffable: they are, qua certainties, ineffable (8) enacted: they can only show themselves in what we say and do..

Some non-propositional picture-sentences meet these criteria. For example, once we have learned to see the pointing gesture of arrows, or picture-faces as faces, they become embedded in our practices of image-based communication. In the current research we speculated that *picture-hinges* would be an additional set of non-propositional picture-sentences that embody the certainties underpinning our practices.

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