

# Psychology as an autonomous discipline: Johannes Linschoten's dissertation

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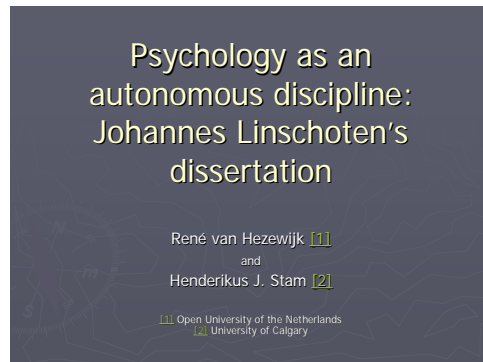
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# Psychology as an autonomous discipline: Johannes Linschoten's dissertation

René van Hezewijk<sup>1</sup> and Henderikus J. Stam<sup>2</sup>



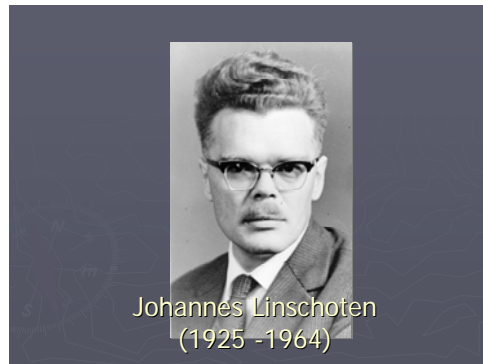
In 1950 (Linschoten, 1950) published an article that can be read as critical of “logical analysis” and as a plea for a phenomenological psychology. It is a thorough phenomenological analysis of movement phenomena, complete with a phenomenological vocabulary although it is unclear if it constitutes a ‘phenomenological psychology’ as such. It was written in the very year that he started the experiments for his outstanding and comprehensive study of binocularity in depth perception (Linschoten, 1956). Close reading of his – by present day standards – very large thesis makes it more clear how already in the fifties – perhaps even before he had read Husserl --

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Linschoten saw the relation of psychology to phenomenology, and to other sciences. We hope to elaborate on this and demonstrate, first, what Linschoten saw as the role phenomenology should have in psychology and, second, what this implies for the autonomy of psychology. (The paper presented here shares the argument with an article in press in *History of Psychology*, submitted by Hank Stam and me (Van Hezewijk & Stam, in press); however, other items are used for the intended demonstration.)



*Linschoten on binocular depth perception*



One thing strikes the reader's eye immediately. It is volumunous book; they don't make them anymore like this. There are 573 pages plus a booklet with 226 figures.

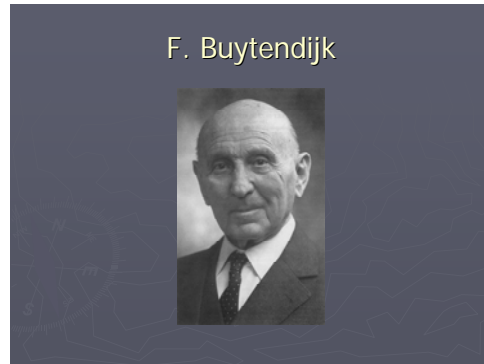
It reports of thorough theoretical analyses of all available binocular depth perception theories at the time, as well as reports of 130 experiments on binocular depth perception. Although you don't often see this in phenomenologists, his thesis shows Linschoten as a sophisticated experimentalist.

In virtually all discussions of Linschoten and his impact on phenomenological psychology, the dissertation is entirely ignored although in studying the development of Linschoten's thought this work (1956) is crucial. It clearly reflects his position in the early years of his scientific career, at the age of 25 – 30, and demonstrates how mature and elaborate his ideas already were at that age. It also demonstrates the manner in which the

relationship between phenomenology and psychology was one of his most central concerns—notwithstanding the changes his ideas about this relationship went through. Furthermore it confirms a repeated theme in his writing, namely, that he thought phenomenology was essential **and fundamental** for a non-reductive psychology. Phenomenology both demonstrates that our experiences cannot be reduced to physiological properties or optical laws, and helps to find the purely psychological explanations of things as they are experienced visually. Moreover he not only demonstrates that phenomenology complements the experimental approach—or perhaps that the experimental method necessarily completes phenomenology, but even more than that: he explicitly uses experiments **as a phenomenological tool** to investigate what it is that psychology must investigate and explain. And last but not least, the thesis shows by its very subject matter that phenomenology can be part of a focus on subjects that are often thought to be at odds with the phenomenological approach.

Linschoten had unambiguous ideas about what phenomenology actually had to offer psychology. It was perhaps

underestimated, even by Buytendijk - his supervisor – how these ideas deviated from those of Buytendijk and the remainder of the ‘Utrecht School’ (we will return to this matter later).



The interesting thing about Linschoten’s approach to depth perception is that traditionally it seems to belong to what now often is referred to as experimental psychology – the field of what in The Netherlands is called *functieleer* and in German was called *Funktionslehre*, a term introduced by Carl Stumpf. This was already a focus of nineteenth century psychology, influenced, no doubt, by the fact that psychology found its form at that time under the influence of scientists with roots in physiology (Wilhelm Wundt, Hermann von Helmholtz), medicine (Ewald Hering), physics (Helmholtz, Gustave Fechner, Ernst Mach) and the like, focusing on questions raised in philosophy and

epistemology by philosophers like René Descartes, John Locke, David Hume, George Berkeley, and Immanuel Kant.

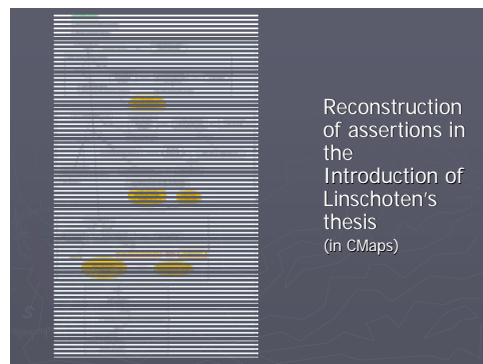


Linschoten considered himself as a discussion partner of these giants, and in a self-confident way, using sophisticated experiments he refuted their ideas, or modified and improved them.

### **The thesis**

Linschoten's dissertation has three parts and a postscript on why human beings have two eyes. The 36 page introduction, in which Linschoten states the general problem of depth perception, concerns the way that the problem traditionally had been (mistakenly) attacked and gives his preliminary remarks about how he will approach the problem. The introduction also demonstrates the importance of this subject in the context of

discussions in the 1950s and the centrality of the questions posed by phenomenologists for the development of psychology. This is illustrated by the fact that there are three main antagonists in Linschoten's thesis. The most prominent ones are Johannes Müller (1801-1858) and Ewald Hering, (1834-1918) who had suggested a nativist, and sensory physiological theory of binocular depth perception. Next are the Gestalt psychologists and Helmholtz (1821-1894) who explicitly defended a – what they considered to be – psychological theory of depth perception.



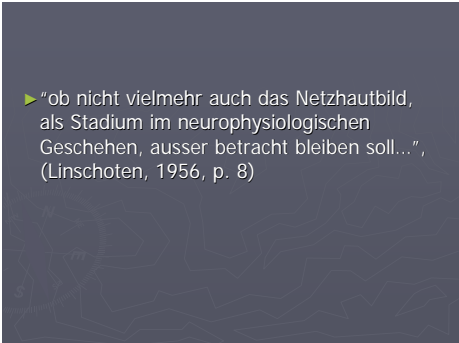
Linschoten, however, is the protagonist of the autonomy of psychology (1956, p. 8) who, among other things, unmasks the nativists/physiologists as covertly using psychological arguments to “cover up” for some unexplained results in the physiological



theory. In line with Lakatos one would have called these manoeuvres “theoretically ad hoc”, that is a solution out of the order of the programmatic line of the theory so far.

Perceiving depth, according to Linschoten, is to *experience* depth, which he meant in a definite *psychological* sense.

Linschoten rhetorically asks the reader whether “the retinal image, as a stage in the neurophysiological events, should not better remain unobserved”



► “ob nicht vielmehr auch das Netzhautbild, als Stadium im neurophysiologischen Geschehen, ausser betracht bleiben soll...”, (Linschoten, 1956, p. 8)

(“ob nicht vielmehr auch das Netzhautbild, als Stadium im neurophysiologischen Geschehen, ausser betracht bleiben soll...”, 1956, p. 8). And, although at the end of the thesis he acknowledges that optical and physiological properties play a role in the formation of both retinal images, he nevertheless claims that there is only one experienced image. Therefore, psychologically, depth *vision* can be studied as the *perception* of one eye with two members (“zweigliederig”).



► "zweigliederig"

And so he does in his experimental studies. He acknowledges that much remains to be discovered about the role of the brain in perception. However, neurological knowledge will never be able to replace psychological knowledge.

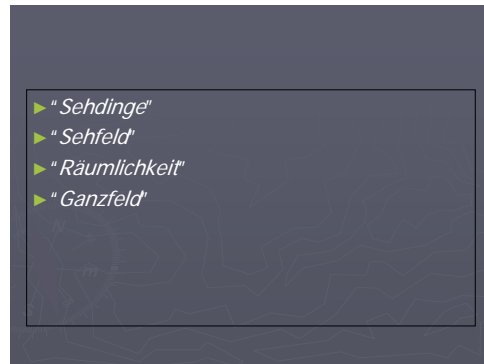
Moreover, a purely psychological approach not only has its value, it is presupposed in any other approach to perceiving depth. So, neither the physical theory that analyzes the optical properties of the stimulus or stimulus situation, nor the psychophysical theory in which proportions of the physical properties are mathematically related to proportions between experiences within one qualitative dimension, nor the structural relations within the retinal field (cf. Hering or Müller), will be sufficient to explain what happens when a human being perceives the 'green leaf of yonder tree.' These theories have their own value but they are not alternatives for the most fundamental

approach, an approach in its own right that lies at the base of the questions about the physiological, optical or psychophysical mechanisms that may be suggested to explain binocular depth perception. He argues explicitly that (depth) *perception* is first of all a matter of phenomenological method, or even a matter of epistemology. That is, before one is going to explain depth perception one has to analyse the structure of depth, the structure of seen things in depth, the structure of what it is for an object to have an orientation and of what it is for moving things to have a direction, etc. One has to acknowledge that – according to Linschoten – height, depth and width are dimensions of a localization system that typically presupposes an observer, at least a perceiving subject – be it a human being or even a non-human organism. Phenomenology does all that, according to Linschoten.

His variety of psychological phenomenology very much resembles the Husserlian perspective – although we suspect that at that time most of Husserl's work still was unknown to Linschoten, if published at all<sup>1</sup>. Husserl had argued in his *Philosophie der Arithmetik* that the basic laws of logic and

mathematics find their most fundamental ground in the experience of the essences of things and relations between things. Husserl saw mathematics as essentially an abstraction of the activity of counting. In *Logische Untersuchungen* Husserl corrected his position, now claiming autonomy for logic and mathematics (Husserl, 1891, 1900-1901). In essence, physics is about things as experienced, and about relations between things as experienced.

Linschoten claims something similar: phenomenology is most fundamentally descriptive of experience before science even can depart. He sometimes seems to equate this with psychology. Thus it appears to be equally relevant for the experience of relations between human beings in the encounter (as is most often regarded as the central claim of the Utrecht School of which Linschoten was then a member) to analyse the structure of social relations and the structure of the way a person encounters his or her world, as it is relevant to analyse the structure of the experience of relations between "natural things" perceived, that is to analyse the "seen things" or -- as he calls them in his thesis -- "*die Sehdinge*" ,



in the one and unified seen field or "*Sehfeld*" although there are two optical fields and retinal fields that constitute it. Depth, and things seen in depth, with an orientation and moving in a direction, are actually characteristic of the (binocular) *Sehfeld* (the seen field). The experienced space is relative to a point somewhere between the physical eyes of a person, an imaginary third eye that perceives in three dimensions whereas our real eyes are technically speaking only capable to register a point's or line's width and height. Yet experiencing the third dimension – depth – is not an unconscious inference a posteriori the stimulation of the two retinas, that is made possible thanks to the innate capacity to infer depth from the "two-eyedness". Depth is not sui generis, but is *originally given and irreducible* (p. 30) and thus the working ground for phenomenology.

Again, to foreclose the problem of forcing consistency where there may be none, we do not claim that this was a deliberately worked out program of research. Rather, we see this as a general underlying approach that allowed Linschoten to write phenomenologically oriented papers while conducting research on fundamental perceptual experience. Actually it is only on one or three locations in the thesis that he makes this explicit, such as on page 12-14, where he states that

*The spacelikeness (or spaceness) of things is a phenomenal Quality that is established in a act of perception. That is why psychology has among other ones the task to investigate the immediately given spacialty. (...) First through a preparatory descriptive analysis of the essential properties of spaceness as such. (...) Secondly, it is psychology's task to analyse the continuity of spacelike phenomena with certain act structures. (...) Third, it has the task to give a structural analysis of the space phenomenon as a empirically encountered fact.*

Die Räumlichkeit der Dinge ist eine phänomenale Qualität, die durch einen Wahrnehmungsakt erfasst wird. Daher hat die Psychologie unter anderem die Aufgabe, diese unmittelbar gegebene Räumlichkeit näher zu erforschen. (...) Erstens durch eine vorbereitende deskriptive Untersuchung nach den wesentlichen Merkmalen der erscheinenden Räumlichkeit als solcher. (...) Zweitens hat die Psychologie zur Aufgabe, den Zusammenhang von den räumlichen Erscheinungsformen mit bestimmten Aktstrukturen zu untersuchen. (...) Drittens hat [sie] die Aufgabe einer Strukturanalyse des Raumphänomens als eines empirisch vorgefundenen Tatbestandes (Linschoten, 1956, p. 12-14).

The claim for an autonomous psychology is definitely an anti-Cartesian, non-dualistic stance. That is, only *after* the experience of, e.g., depth, the dualism of the explanation of seeing things *in* depth by referring to the internal and external worlds come into existence. And it is only after this experience that the logic and physics, or the physiology and mathematics of spatial perception become possible. So in the first instance the thesis is anti-reductionistic and anti-mechanistic. In that sense it seems to contrast with his later work, *Idolen* (Linschoten, 1964). However, we think it is only a superficial reading of both works that supports this claim. The message from the Linschoten of 1956 is only a little bit different from that in 1964, its means (experiments) are what he pleaded for in 1964. What is different is the scope and domain of the subject matter, and the explicitness of the message. As for the explicitness, we limit ourselves here to

the remark that in the Ph.D. Thesis of 1956 Linschoten explicitly has the intention to give a phenomenological analysis of the a priori's of perceiving depth, using theoretical and experimental analysis very much the way it is done in some domains of modern sciences, such as linguistics.

As far as the scope and domain – depth perception -- is concerned, in the remainder of this paper we go into some details. Depth perception is most fundamentally a phenomenological experience. It is not a physical (optical) event, nor is it the result of an “unconscious inference” (Helmholtz' *unbewußter\_Schlüsse*) about a retinal event, let alone a conscious construction. It is not even remotely possible to have a physical, psychophysical, optical or physiological explanation of perceiving depth, without first having had an in depth analysis of what it is to perceive – that is to *experience* – depth. In fact, Linschoten (in §6 of his introduction) analyzes depth very much as Husserl must have intended when he introduced the so-called eidetic reduction, and as Brentano implied when he pointed to the intentionality of conscious experience. Space – or “spaceness” (*Räumlichkeit*)-- lies at the root of depth. Space has a left-right dimension, a front-back dimension



and an up-down dimension *in experience*. That is for an observer, and for an observer only. Space has a field structure, it provides opportunities for objects to have an orientation *for an observer*. Even under the influence of a *Ganzfeld* (the technical term for “seeing” through halved table-tennis balls placed over the eye, actually resulting in seeing nothing more than light as if in a very thick fog) one cannot but experience space and objects in depth even when the stimulation is fully equal at all points on the retina.

Not all phenomena – all things as experienced – are “only” optical or physiological events. The ‘spatiality’ and the ‘orientationality’ of things cannot be reduced to optical or physiological properties. Indeed one sees *nothing* when there is not a *thing* to be seen; however the thing – whether it is a “thinglike” or “spacelike” thing – will be seen *somewhere*, in the “openness” of the optical field (1956, p. 21), as a thing. Spatiality should be understood as an observable quality – or perhaps it is better to translate it as a “phenomenal” (“*anschauliche*”). The structure and forms of this quality are analyzable in terms of the conditions of the optical field they depend on. For instance, one

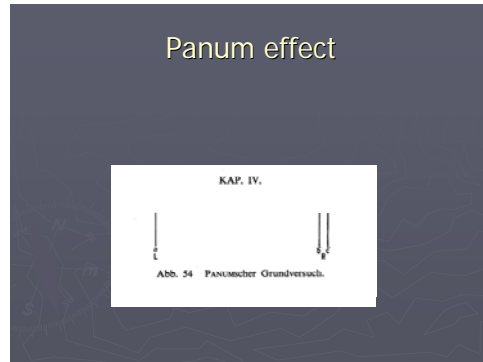
can predict the conditions under which empty space is perceived, when the so-called 'glass experience'<sup>ii</sup> will occur, how smoke and fog will be experienced and when the voluminosity of physical bodies will be perceived. But all of these presuppose the irreducible "*Urphenomen*" of spatiality.

### **The experiments**

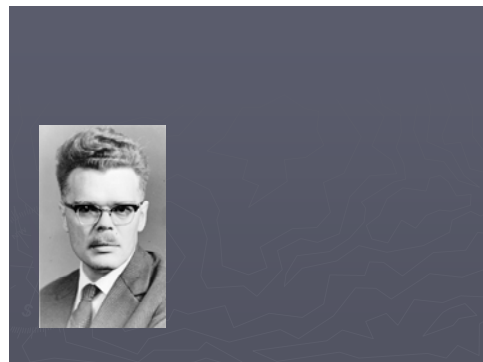
Although verbalizations like this were quite usual and accepted among the members of the Utrecht School, Linschoten must not have been satisfied with them. So after discussing the work on binocular depth perception by Johannes Müller, the modifications by Ewald Hering, Wheatstone, Fechner, Panum, Volkman, Helmholtz and others, Linschoten presents his report of 130 experiments over 300 pages in his thesis. In the *experimental* division there are five chapters discussing and reporting on

- experiments on seeing double and the experience of corresponding retinal points;
- the Panum effect<sup>iii</sup>; The Panum Effect is the effect whereby looking through a stereoscope (or focussing beyond the picture) at a single straight line on the left

and two straight lines  $b'$  and  $c'$  on the right, the experience will be of two lines  $a$  and  $c'$  (in which  $b'$  apparently has joined  $a$ )



- the limits of the attraction between an occupied and an unoccupied visual field;
- the formative moment (*"Gestaltungsmoment"*) in the spatial organization of the aggregated image (*"Sammelbild"*); and
- the relations between eye movements and depth perception.



Linschoten undertakes the task of testing or retesting all the elements of Hering's theory of depth perception and its modifications, as well as the relevant preceding experiments. He also discusses relevant experiments conducted earlier by perception researchers, including Gestalt theorists. Of the one hundred and thirty experiments that were conducted and briefly reported, some are modifications or sophisticated versions of earlier experiments conducted by perception researchers.

In his experimental procedures, Linschoten clearly made use of a basic rule that is still used in psychophysics and such disciplines as linguistics, namely, that in some cases it is relatively unimportant to include more than a few participants in an experiment, although these participants provide multiple data-points. Linschoten sometimes used a small number of participants (although at other times he reports that 40 persons participated). The most important reason to invite a larger number of participants is to diminish the effect of individual differences and of individuals intentionally influencing results. This would explain why in some cases  $n=1$  or  $n \leq 5$  is acceptable. Whenever there are good reasons to believe that human beings in

general do not differ in the way they react or process input, one might as well use one participant as many. This is the case when there are good arguments to believe that persons cannot influence the outcome of the experiment, and when the outcome will be the same with every normal subject. It is also in line with the tradition of early German experimentation in psychology (e.g., Wundt), in which an experiment often was a demonstration of an effect, instead of a test of a hypothesis. Of course it is not easy to establish when this is the case, but it *is* probably reasonable to suggest that the processing of visual stimuli in the periphery of the perceptual system meets these requirements. The reasonableness, however, always depends on one's prior theory of the processes involved.

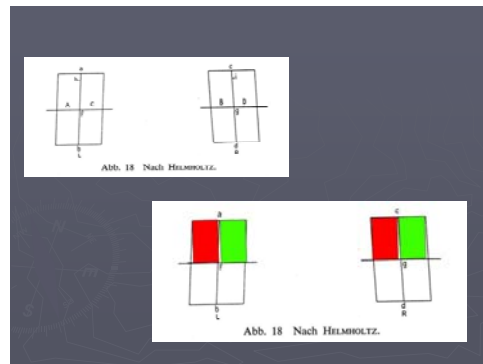
In the case of Linschoten's thesis he is not always clear about the number of participants that he used in the experiments to support his claims or refute the claims of others<sup>iv</sup>. What counts, is that the readers can check the results of the experimental setup themselves. The experiments in his thesis are carefully illustrated with hundreds of figures, printed in an accompanying 60 pages booklet. Even without a stereoscope it is often possible to verify

the outcome with the naked eyes. Hence, as in classical psychophysics, the experiments are continued until the desired effect is achieved – after which the illustrations serve to demonstrate the effect in such a way that any reader can verify the phenomenon.<sup>v</sup> But it is important to realize what the phrase “untill the desired effect is reached” actually means. It is not to prove or disprove a theory, so much as it is to qualitatively analyze, experimentally, in depth, the fundamental features of seeing in space. The desired effect is “to secure a qualitative specificity (*Angemessenheit*) of descriptions and observations.” (p. 35).

It is important to remember here that Linschoten claimed an autonomous domain for psychology apart from the physiological and sociological domains. Moreover Linschoten claimed a phenomenological accessibility for the results of the psychological research, even though no influence on the result is possible through suggestion. Theoretically he had already demonstrated that Hering implicitly presupposes psychological (or at least subjective) concepts in his alleged physiological explanation of seeing in depth. For instance, Hering introduces

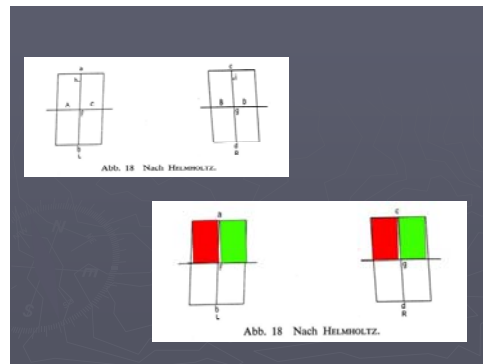
“height” and “width”, direction and orientation of seen things but they already presuppose e.g. a direction *for an observer*.

Already in the first experiment discussed he shows that there must irreducibly be psychological explanations involved in understanding some phenomena demonstrated below.



Looking at this picture through a stereoscope, or focussing a point infinitely beyond the picture plane in the middle, one experiences the “floating” of both pictures together in one in the middle. Interestingly the resulting picture is no longer skewed. Also, the lines a-b and c-d have joined and resulted in one vertical line.

In the corresponding points here *indicated* as *h* and *i*,  
 (meaning pointing at them, they are not meant to be real points) will  
 unify into the resulting plane and will not be experienced as  
 before or behind the plane. We hardly “see” them. *h* will be  
 somewhere on the red part of the resulting plane, *I* will be on the  
 green part.

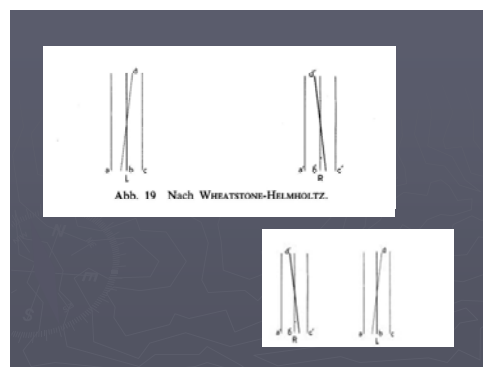


If we take the points as points as such (not as indications of  
 something in or on the planes) then the disparate points will not  
 result in experiencing one point on the plane but as a point in the  
 space before or after the plane. Hering already criticized  
 Helmholtz for not recognizing that.

Hering was right, according to Linschoten. But he was  
 wrong in not concluding that this implies a *psychological*  
 explanation. And it also shows that this is not a matter of *points*,

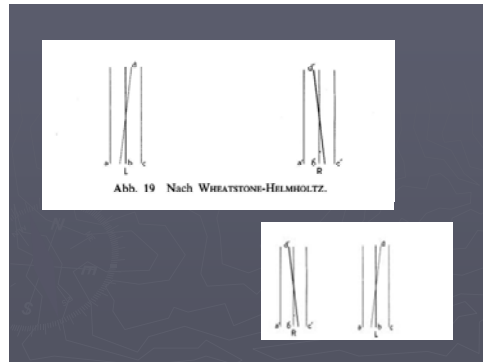


whether corresponding or disparate or whatever, but of planes and contours of items that can be seen as things. That's why Linschoten already after the third page of this chapter concludes that it is *functional* points and contours, versus functionless points that are at stake in the explanation of seeing things in depth. And if they are functional they must be functional *for* a subject (an organism, a person).

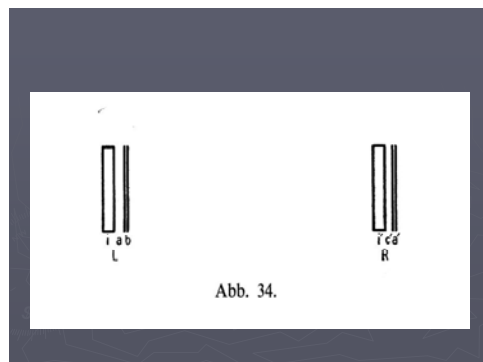


Staring “through” this picture reveals according to all participants of the experiment, that lines will unify in the following way: (a,a'), (b, d'), (d,b') and (c,c'). The outside lines unify, the thick lines join, and the thin lines join. The thin lines skew such that the top of it (like d does in the left picture), tumbles outside the image plane toward the observer, with the tipover point exactly at the crossings of the line. (Exchanging

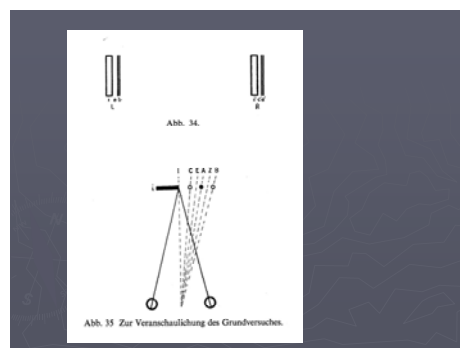
locations of both semi pictures leads to a change: the line tumbles  
“away” from the observer.



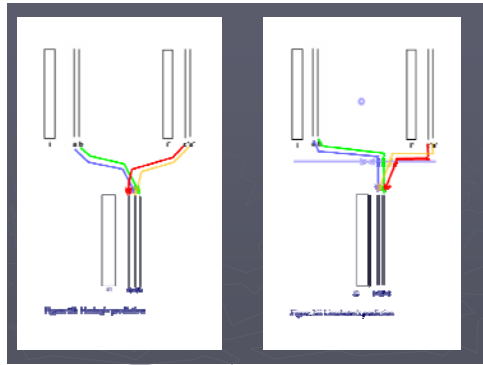
Moreover, in other experiments he unambiguously demonstrates that Hering's theory is incorrect. Linschoten designed the illustration in Figure 2 to demonstrate this.



The original theory by Johannes Müller suggested that there would be identical (or, within limits, disparate) corresponding retinal points of the left figure with retinal points of the right figure. Both monocular figures would lead to the perception of one binocular figure. The question is: what would be the resulting figure? Apart from other theoretical problems the original physiological (retinal) theory would predict the same figure as Hering's last modification of it. The last modification of Hering suggested that the virtual lines from the binocular (third) eye to the optical points in the figures would result in a compiled figure (*Sammelbild*) with one rectangle (resulting of  $i$  and  $i'$ ) and three other lines.

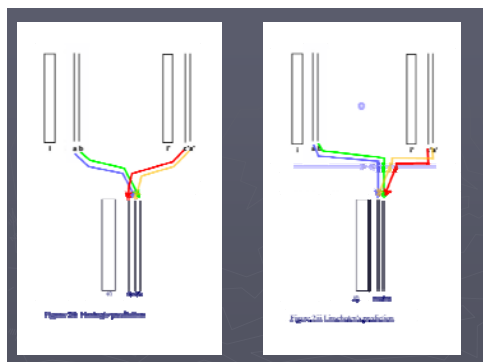


That is,  $c$ ,  $(a, a')$  and  $b$ .  $b$  and  $c'$  were supposed to be the result of a double panum-effect. It *would* have led to this:

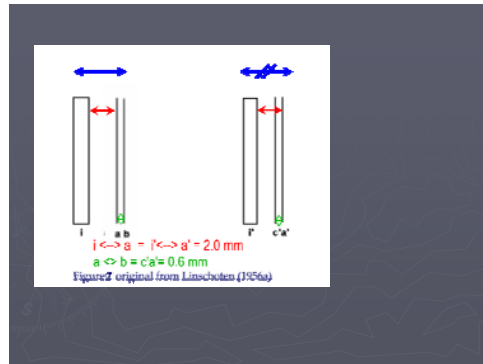


That is, when using a stereoscope, or focusing on an imaginary point in space beyond the figure, the effect will be a virtual movement of the right and the left parts of the pictures towards each other. Hering's theory would predict that the rectangles  $i$  and  $i'$  fuse into one rectangle and that *three* lines will show:  $c'$ ,  $\langle a, a' \rangle^{vi}$  and  $b$ .

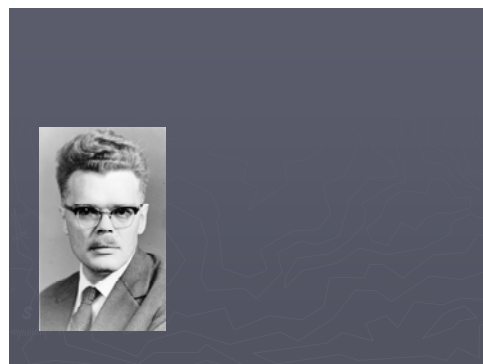
However, what every one of the forty participants reported and what every participant today still reports, is that  $\langle i, i' \rangle$  have fused and that the other lines have fused in two lines:  $\langle a, c' \rangle$  and  $\langle b, a' \rangle$  on the right of the rectangle (as in Figure 2iii).



No one reports a separate line b. Note that the space on the right of the rectangle is larger for the left rectangle (i) than it is for (i').



This implies that neither the (physiological) law of correspondence is correct, nor the law that states that objects on disparate positions can only fuse when the locations that correspond with each other are disturbed only slightly.



**Conclusion**

This and other complimentary experiments resulted in Linschoten's rejection of Hering's theory as insufficient on both theoretical grounds, as on experimental findings.

Linschoten concluded that, in general, it is not the properties of the corresponding or disparate points that can explain the phenomena of depth perception, nor the virtual lines that can be drawn from the virtual foveal to the seen spots (or the projected spots). Instead one must find them in the Gestalt qualities of the figures themselves. He summarizes this in the proposition that "in the (one) experienced image the (two) seen pictures that represent the left eye and right eye versions of one gestalt, are fused independently of the question whether they are pictured as corresponding or as disparate points" (1956, p. 124).

More importantly Linschoten concluded that psychological judgment are autonomous, irreducible, and that they were *phenomenal* judgment that as such are very real, at least in their consequences. Some phenomena cannot be reduced to physiological or optical qualities. Gestalt qualities are one of them.

However, this is not to say that the 'naïve' participant is to be believed under any circumstances, even if he or she is a psychologist. He clearly states that only persons that are experienced in optics and have analysed the phenomena to be explained in their phenomenal properties, can draw conclusions about some of the workings of perception. This means that phenomenology enlightened by knowledge of nature helps the psychologist explain perceptual phenomena.

The other 129 experiments and their detailed discussions cannot be relayed here. They concern, among other things, the quantitative properties of binocular depth perception, such as boundary conditions of attraction, the minimal dispersion necessary for depth perception, the relation between the degree of dispersion and perceived depth, and so on. Linschoten also discusses his dynamic theory of depth perception. After experimentally analyzing the contribution of Gestalt theory, Linschoten shows it to fail in explaining binocular depth perception and its remarkable effects. First, although Gestalt theory denies the 'point-for-point' approach of binocular depth perception (the foundation of Hering's theory), it is still based on

the comparison of two monocular Gestalt configurations. "It is as if the elementary processes still have the same configurational properties as the phenomenal Gestalts"



[“Man tut als hätten die Elementarvorgänge noch die gleichen konfigurationellen Eigenschaften wie die phenomenal Gestalten”] (1956, p. 315).

Second, Gestalt theory supposes that there is a configurational explanation for the attraction between the disparate elements of the two retinal Gestalts, instead of a dynamic explanation. Gestalt theory explains the fusion of images as an effect of the configurational properties like the Gestalt laws of proximity or resemblance. However, Linschoten shows experimentally that the dynamic tendency to fuse is more fundamental than the configurational, and it sometimes even goes against the resemblance or proximity laws of the Gestaltists.



“The tendency to organize the total image with a minimum of conflicting experiences” is more fundamental [*Die Tendenz das Sammelbild mit einem Minimum von Wettstreiterscheinungen zu organisieren*] (1956, p. 318). Correspondency and dispersion are *not* geometrical projective proportions but are dynamical results (p. 389). It is as if the one image with and in depth forces the binocular images to fuse, or to be attracted to it, according to the laws of the imaged object in its own spatial field.

Having demonstrated his mastery of experimentation, and his understanding that perceptual phenomena are not to be explained completely by reference to either the optical properties of the physical stimulus or the physiological properties of the perceiver, Linschoten moves to the theoretical implications of his work. The third, theoretical, division formulates the dynamic theory of depth perception. It is nevertheless 156 pages long and contains four chapters<sup>vii</sup>. In these chapters Linschoten demonstrates his theoretical competence, meaning the competence to discuss and analyze the implications of experiments, hypotheses, theory and postulates at levels ranging from the philosophical to the mathematical, and from theory to

predictions in experiments. The conclusion is, first, anti-reductionistic and anti-mechanistic, and a strong argument for an autonomous psychology.

Note that, nowhere, phenomenology is used as a psychological method. Phenomenological analyses are the basis of the check on whether the claims for psychological explanations of perception can be held at all; however they are a priori of psychology, not within psychology. The fact that he used depth perception as the field on which to focus is—interesting and important though it is—merely a matter of example. Linschoten’s thesis remains a contemporary work although much has been added to the field in recent years—both psychologically as well as physiologically and anatomically. The thesis constitutes a central part of Linschoten’s work and approach and should be considered in relation to his other works, particularly when considering the question of his rejection of phenomenology.



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## Abstract

In 1956 Johannes Linschoten – one of the members of the alleged phenomenological Utrecht School – presented his dissertation on binocular space perception. He surprised many a colleague with a work of 573 pages plus a booklet of 226 figures, written in German, containing an introductory part, an experimental part and a theoretical part (Linschoten, 1956).

The introduction offered an overview of the theory that was focussed most on binocular space perception at that time (Hering's Theory of Identity), and its follow up versions.

The experimental part reported of 130 experiments. In the experimental part Linschoten not only criticized this theory, but also other candidates from other, more general, theories of perception (Wheatstone, Helmholtz, Gestalt theory). He discussed the Panum-effect in his analysis and experiments, and attraction of image points of the two retinal images involved as an explanation, as well as the role of eye movements.

The theoretical part is an analysis of the role binocular depth perception plays for the organism in the localisation of significant objects in the depth of the "structured spaceness (Räumlichkeit)". He presented a dynamic theory of binocular space perception and concluded with his answer to the question why human beings have two eyes.

Although at first hand this dissertation can be viewed as an excellent combination of experimental *and* theoretical approach to solve a complex problem, and as the opposite of a phenomenological approach that could have been expected from this author, we argue for a different point of view. We will point out that the phenomenological approach in the Utrecht School of the fifties did not exclude experimental work at all, and will demonstrate that, more importantly, Linschoten's aim with his dissertation was to argue that in any account of binocular depth perception a psychological explanation is inevitable. In other words: psychology is an autonomous discipline. It demonstrably involves explanatory problems that can only be solved by presupposing a *psychologically* active organism.

Continuing our research Linschoten in psychology (Stam & Van Hezewijk, 2004; Van Hezewijk & Stam, 2006; Van Hezewijk, Stam, & Panhuysen, 2001, 2002) we tend to believe that initially Linschoten believed that only a phenomenological approach could guarantee the autonomy of psychology as a discipline. However, Linschoten changed his views during his short life, to end with the apparent opposite view (Linschoten, 1964), that psychology should be reductive and experimental.

Our argument will include references to Linschoten's recovered master thesis (Linschoten, 1949), earlier work on space and movement perception (Linschoten, 1950, 1952), and copies of handwritten notes for his dissertation.

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<sup>i</sup> There is only one reference in the thesis to Husserl's *Logische Untersuchungen*, on page 418, where in a footnote he claims that it is to be regretted that Gestalt theory has neglected Husserl's phenomenological investigations.

<sup>ii</sup> 'Glass experience' refers to the phenomenon of being able to see through, but not walk through, glass. It is opposed to the phenomenon of, for example, walking through fog that one cannot see through.

<sup>iii</sup> The Panum Effect is the effect whereby looking through a stereoscope (or focussing beyond the picture) at a single straight line a on the left and two straight lines b' and c' on the right, the experience will be of two lines a and c' (in which b' apparently has joined a).

<sup>iv</sup> E.P. Köster, one of his students in the early fifties, reports that he assisted Linschoten in experiments 121 and 122. In these experiments he worked with 10-12 participants – students that were not familiar with the theory at stake (E.P. Köster in an e-mail communication with the first author of 19-10-2006).

<sup>v</sup> We thank Amedeo Giorgi for noting the generality of this way of proceeding, that is until the demonstrator obtains the effect desired. However, we have continued to use the label Linschoten used ("experiments") to describe his studies, to distinguish them from mere demonstrations.

<sup>vi</sup> <a,a'> means that lines a and a' (or objects a and a') are seen as one line.

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<sup>vii</sup> Chapter eight discusses a dynamic theory of depth localization, chapter nine confronts Herings theory and the attraction theory with sense physiological facts, and chapter ten looks at the dynamical explanation of the Gestalt theory of depth perception at the psychophysical level.