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## **Fritz Heider and Egon Brunswik**

### **Their lens models**

### **Origins, similarities, discrepancies**

#### **1. Introduction**

During their common time in Austria (and Germany), Fritz Heider and Egon Brunswik knew each other quite well, meeting for professional interchange of their ideas and thoughts, which they mutually highly respected (compare the late autobiography by Heider, 1983).

They both worked on problems of how the human being copes with his environment; later on (in the early 50s), they both were regarded as pioneers of cognitive psychology.

Despite these similarities, however, the detachment between the two scientists became more prominent during their years in the United States. Heider mainly followed the research of Kurt Lewin, which was a continuation of their excellent contacts in Berlin. The estrangement between Heider and Brunswik while in the US was based in part on the lack of understanding for Brunswik's „Functional Probabilism“ and his object-based psychology. Despite this growing distance, Heider, in his essential book „The psychology of interpersonal relations“, deeply acknowledged Brunswik's scientific contributions for perceptual psychology as late as 1958, three years after Brunswik's death. Heider's book was the product of several decades of research, and (until today) it has shown lasting effects for broad parts of social psychology and cognitive psychology. As a part of such a key contribution to psychology, the repeated reference to Brunswik deserves special attention.

The disgruntlement during the later years however applies only to Heider's feelings; he criticized Brunswik's lens model which, in his opinion, should have taken into account his own approach much more. In contrast, Brunswik expresses a high respect for Heider's ideas on several occasions. This very positive attitude also manifests itself in the explicit reference to

the great importance of Heider's theoretical writings with regard to Brunswik's own lens model (Brunswik, 1952, bibliographical note 20, p. 94): „Aside from the considerations of the classical behaviorists on vicarious functioning, the ground for the analysis of the lens analogy was laid by two papers of F. Heider, 'Ding und Medium' (Symposium 1, 1926), in which a regional stratification of the environment in general physical terms, emphasizing the pliable 'messenger' character of such 'media' as light rays, is attempted, and 'Die Leistung des Wahrnehmungssystems' (Zeitschrift für Psychologie, 114, 1930, p. 381). For a lens model similar to the present one (Figure 4) see Brunswik (1934).“

Within the framework of this personal contact between two important psychologists of the 20th century, which lasted over decades, even though it became somewhat difficult in the later years, it is worth analyzing the origins of the lens model. From the complete oeuvre of Egon Brunswik, which still today remains mainly unknown, the term „lens model“ stands out as the only prominent concept. If anyone in psychology knows the name Brunswik at all, it is foremost associated with the „lens model“. His name is connected to the topic of the „lens model“ in a powerful manner, no matter which modern theoretical application or even misinterpretation one deals with. Brunswik clearly is known to be the father of the „lens model“.

This perception, however, is incorrect; Fritz Heider – seven years Brunswik's senior – has published basic „Brunswikian“ ideas, long before Egon Brunswik was able to start his publications. This is also and especially true for the „lens model“, which was presented by Brunswik first in a provisional form in 1934 (Habilitation = his postdoctoral thesis) and then as an elaborated composition in 1952 („Conceptual Framework“). Heider, on the other hand, already emphasized the importance of the lens as early as 1926 („Ding und Medium“).

We don't want to raise the impression that the unique oeuvre of Egon Brunswik is questioned here in any way; it is not at all „Heiderian“ in many decisive aspects.

Brunswik went his own way, and as a scientist remained a profound individualist and loner. This kind of independence is true also for his „lens model“. However, I would like to show on the basis of the lens models by both Heider and Brunswik that important origins can be traced back to Heider, who later suffered from the fact that his version of the model not only remained mostly unnoticed, but was wrongly redefined by Brunswik for his own popular and widely acknowledged lens model, as Heider later believed.

## 2. The lives of two psychologists

Heider born 1896 Vienna

Heider 1920 Dissertation Graz

Heider 1926 Ding und Medium

Heider 1930 Leistung Wahrnehmungssystem

Heider 1930 USA (mainly Kansas University)

Heider 1939 Environmental determinants

Heider 1944 Social perception

Functionalism

Heider 1957 Cognitive theory

Heider 1958 Psychology Interpersonal Relations

Heider 1983 Autobiography

Heider 1987-88 Publication of the notebooks

Heider deceased 1988

Brunswik born 1903 Budapest

Brunswik 1927 Dissertation Vienna

Brunswik 1931-32 Ankara

Brunswik 1934 Habilitation Vienna

Tolman & Brunswik 1935

Brunswik 1935 USA (Berkeley)

Brunswik 1939 Conceptual Focus

Brunswik 1941/43 Chicago discussion

Brunswik 1952 Conceptual Framework

Brunswik 1955 Probabilistic

Brunswik deceased 1955

Brunswik 1956 Representative Design

Brunswik 1957 Scope and aspects

Brunswik 1966 Reasoning

Hammond 1966 Psychology of

Egon Brunswik

Wolf 1995 Brunswik

Hammond & Stewart 2001 Essential

Brunswik

## 3. Theoretical contributions by Heider (1926; 1930) in anticipation of Brunswik

It must be stated without reservations: Heider, not Brunswik, is the „father“ of the lens analogy. In his publication „Ding und Medium“, Heider gives clear statements on the functioning of the lens. The characteristic of this primary Heiderian lens-model (Heider, 1926, pp. 146-147) is expressed in the following words:

*(All statements by Heider, 1926 or 1930, are translated from German into English).*

„Any mechanical apparatus at the entrance of the sense organs, such as lenses, compound eye, or cochlea with resonators, have the task of analysing the diversity of events. All these apparatuses are similar to resonators to the extent of being filters. They only respond to extremely limited events; all disturbing and concealing events are blocked off. Thus the single item is filtered out of the over-all mixture. The single point of the focusing screen of the pinhole camera only responds to rays directed in a particular way, similar to the compound eye of an insect. The lens is still more effective because it not only blocks all things coming from other units, but also collects and focuses the diversity coming from one unit. It is already the beginning of a synthesis. Admittedly it is only the beginning. For the lens restores the order of the points which transmit the light, but the assignments are still lacking a concept as to how the points are combined to units. On the focusing screen, meaning just before the retina, the individual points are equal in value, they are atomistic.“

(Heider, 1926, p. 145)

„If we were to construct an apparatus which reacts to outside things with the help of a medium that has been assigned in a meaningful way, we would have to build this apparatus in such a way that it reconnects the varieties, deriving from single units, back to units. In that sense, the synthesis is caused by the outside world. We suppose that their special laws cannot be derived entirely from the psychic realm.“

(Heider, 1926, p. 147)

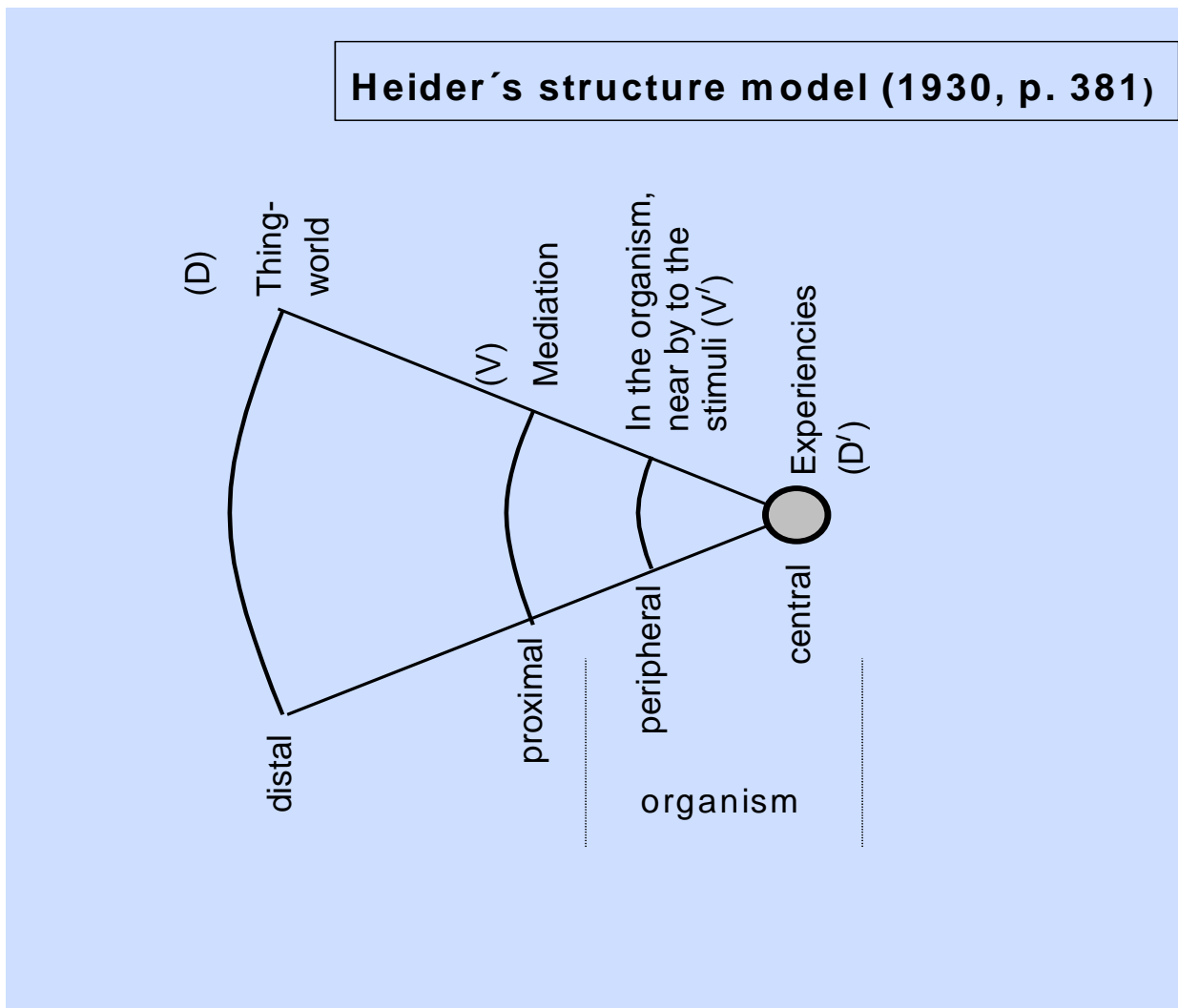
„If the medium were not homogenous and the rays did not spread out according to a general scheme, a unifying apparatus such as the lens that is universally applicable would be impossible. It would be conceivable to construct an apparatus which unites the rays coming from one point. However, a special apparatus would have to be created for each place within space if the medium was not homogenous. A double classification is already relevant in the lens that is of utmost importance. For there is first the event itself, but besides that is its meaning. In some ways, the rays mean the points from which they originate. And when they are brought back together, it is done so in a correct, meaningful way. This is analogous to the relation of the physical to the psychological. The physical is the supporter of the psychological. There are two layers of functional connections put on top of each other. Again, the cues must be meaningfully reconnected to units. Thus the kind of standardization is determined by the laws which assign the cues to the big objects. Of course, the physiological event which performs this standardization follows its own laws apart from what it means.“

(Heider, 1926, p. 148)

„A lens is such a generally useful apparatus. We have already indicated how the strangely mechanical aspect in its achievement must be understood. In contrast to its processing within the nerve structure, the lens is mechanically rigid. It does not need to develop, it does not need to make any experience. We are even able to improve our ability to perceive by creating things in workshops, such as glasses, microscopes and telescopes.“

Heider also developed a model on the structure of „environment and organism“ (1930, page 381), which corresponds in part with the structural model by Brunswik, differing however with regard to the pivotal aspect of object relation. Heider’s approach resembles the left part of Brunswik’s structure model.

Figure 1: Heider’s structure model



D: The environment which is relevant for life (the thing-world, including other men (people), occurrences etc.) (distal objects in the outside world)

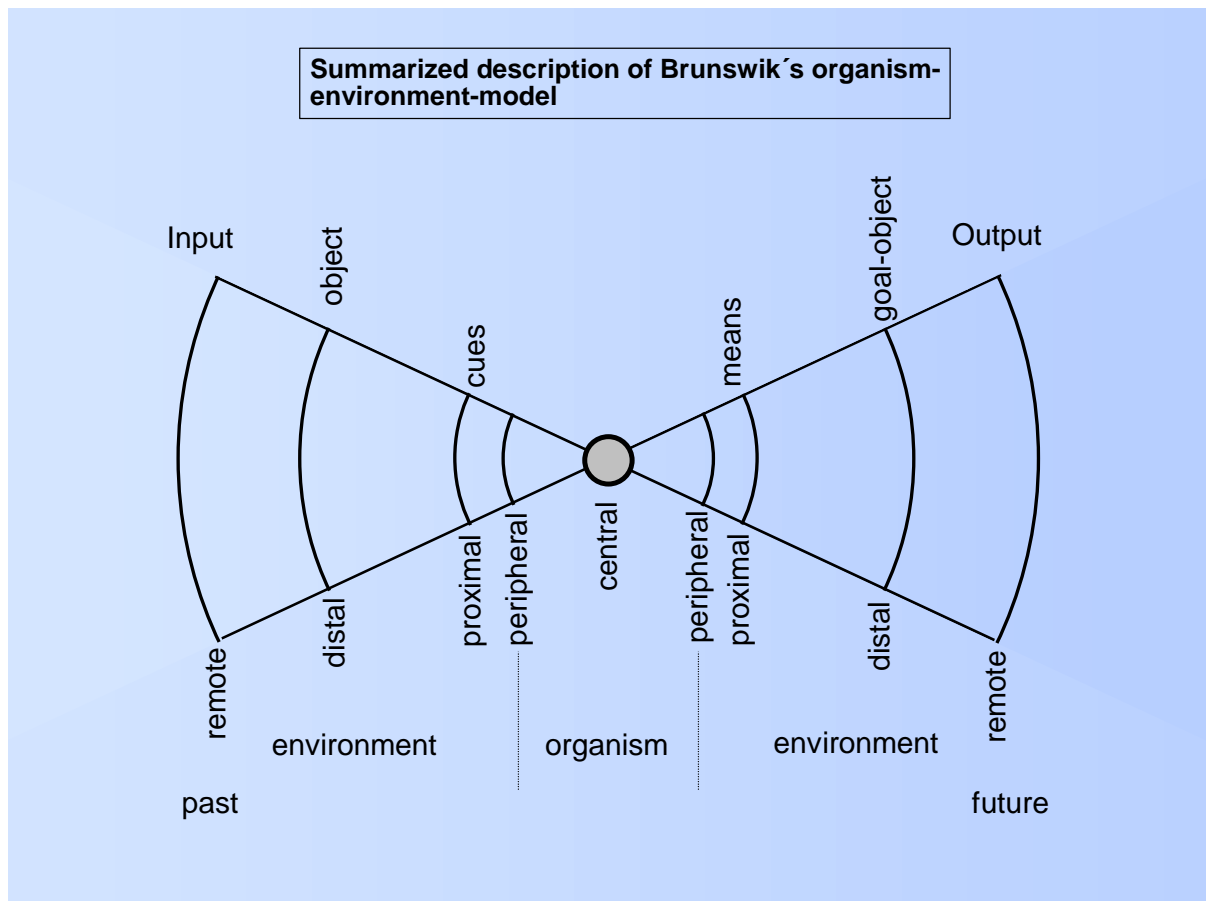
V: The mediating events in the medium, the stimuli which hit the organism immediately (proximal in the outside world)

V': The events in the organism, which are adequate nearby to the stimuli (peripheral within the organism)

D': Experiences which are directed toward things (this layer belongs to the central part of the organism but it is no specification in Brunswik's structure model).

You can find the structure-model of Brunswik (organism-environment-model) in figure 2:

Figure 2: Brunswik's structure model



In addition, Heider (1930, page 385) already looked into the same process feature by way of a hint which Brunswik later named „vicarious functioning“ as a central part of his work.

„The essential and invariant part in the process of perception lies in the relation of the two layers D and D'; for the organism lives with and within the things, and the events which are relevant for life. The single event of mediation is to a large degree flexible, is replaceable and is put in between (D and D') without an absolute assignment. If anything new happens in the mediation, it seems to settle itself with respect to and lead by the essential layer D.“

Heider's foresight (1930, page 382) can also be seen in the phenomena that later were emphasized by Brunswik as „ecological validity“ and „functional validity“. Functional validity is directed in Heider's system toward layer D' (experiences within the central part of the organism), whereas Brunswik's functional validity aims at focusing on environmental objects within the region of action, which cannot be found in Heider's system.

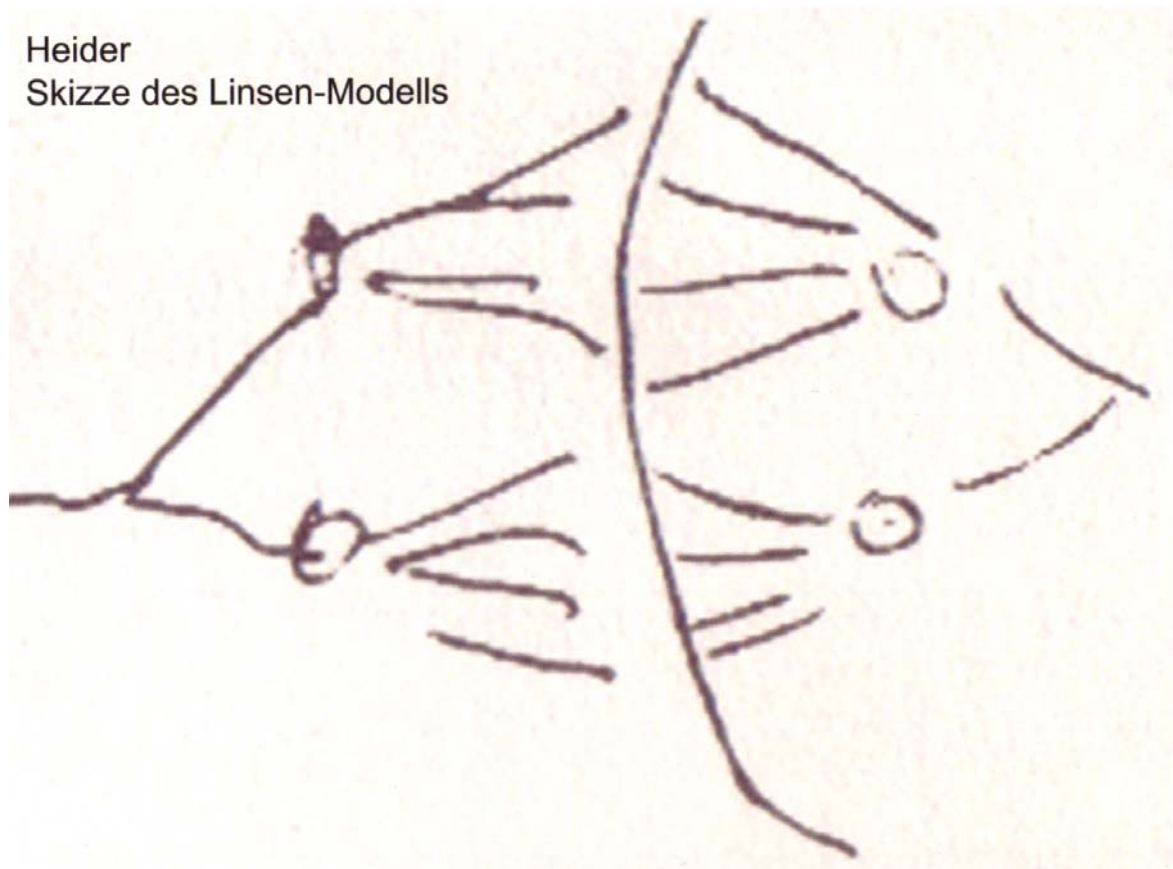
„The layers VV' - that is the layer of mediation - do not correspond exactly with the two corresponding layers D-D', which connect above this layer of mediation. In other words, the VV'-layers are not exact reproductions of the DD'-layers.“

„The relation of D to D' is very close.“

Finally, it should be mentioned that the aspect of „equivocality“ already played an important role in Heider's early publications.

#### 4. Heider's lens model as seen in his notebooks (Heider, 1988)

Figure 3: Draft of Heider's lens model (Heider, 1988, p. 49)



Grammar stages, network of connection proximal-distal (p.43)

Grammar (p. 50)

Organized (p. 47)

Systematic, with a logic of combination (p. 49)

Spurious units (p. 48) - the way the proximal stimulus array is worked over

A kind of Gestalt process - a complicated putting together - a puzzle solving  
(p. 48)

Gestalt kind, Galilean with quasi-hypothesis, quasi systematic definitions (p. 48)

What I miss most in Egon's psychology is that he does not include in it the possibility that maybe there are systematic connections - not between environmental entities and psychological variables - but between psychological variables themselves, within the „o“ level. I still find Lewin's attempts in this direction extremely fruitful and promising. (out of a letter to Ken Hammond; p. 45).



## 5. Brunswik's lens model as seen in Heider's notebooks (Heider, 1988)

Statistically (p. 50)

Additively (p. 47)

Atomistic single signals are combined in a simplicistic statistical model, a Simple kind of addition (p. 48)

Mechanical combination of elements (p. 49)

Dictionary of connection proximal-distal (p. 43)

Atomistic ideas about the cues, independent of each other (p. 48)

Baconian, statistical (p. 48)

Heider, 1988, p. 48:

„I am not very hopeful about Brunswik's use of the lens model“

„Distorted lens analogy“

## 6. Brunswik's lens model as an integral part of his scientific work (Brunswik, 1934; 1943; 1952; 1955)

1934 (p.96): preparation of the concept lens-model

„Synthesator“ (Heider: „Resonator“)

Convex, collecting lens

Shattering effects

Causal processes tatter

Collected, brought together, melting together in one effect

The lens model is integrated into a differentiated theoretical system.

Object-orientation of Brunswik's extensive structure-model.

Distal input - central position of the organism - distal output.

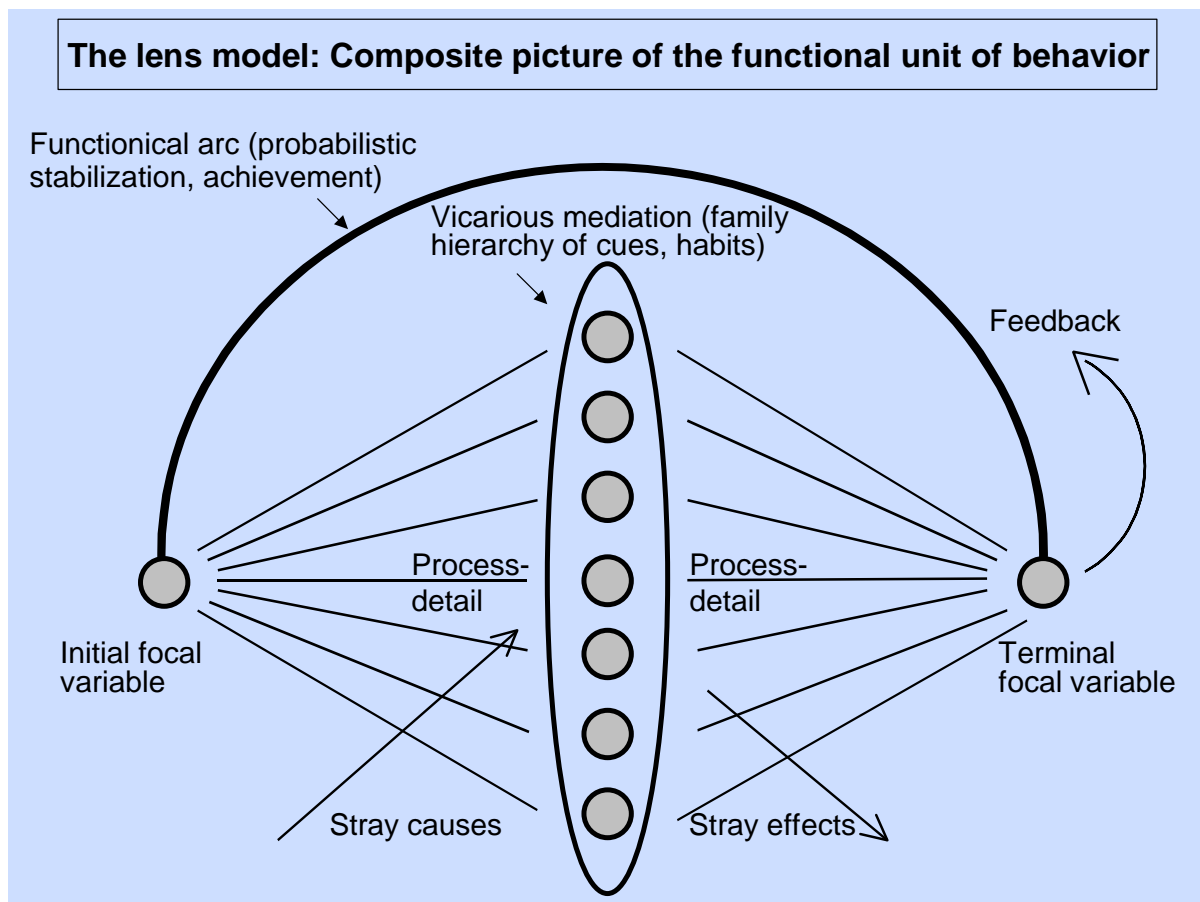
Objects are elements of psychological analysis (unusual for the mainstream of psychology).

Inferring the psychological out of objects. (This is the important difference between Heider and Brunswik, which confused Heider).

Vicarious functioning: The mutual replacement and substitution is not atomistic, not mechanical.

Ecological validity, functional validity and equivocality are central elements of the theory, in which the lens model is embedded.

Figure 4: Brunswik's lens model (1952, p. 20)



## 7. Conclusions

There is a great number of corresponding aspects and similarities between the two lens models of Heider and Brunswik. The process courses are identical, e.g. concentration of variety in one integrated whole (Heider) = focusing (Brunswik). The principals of „ecological validity“, „functional validity“ and „vicarious functioning“ suggested by Heider have later been differentiated and further developed by Brunswik. This holds true also for the necessary

principle of ambiguity („equivocality“). In all these important aspects, Heider and Brunswik share very similar theoretical approaches.

On the other hand, there is one important discrepancy concerning the embedding of the process feature called „lens model“ into a psychological structure. While Heider starts off from Lewin’s principles, positioning his lens in Lewin’s „life space“ as ending in the organism, Brunswik appoints great significance to the objects by positioning the lens within the object-related environment (with the human organism being the center). Especially regarding the question of the relevance of the object relation there are great differences between Heider’s and Brunswik’s theories, and this is precisely where Heider’s obvious disgruntlement stems from.

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