

**Comments from an Invited Presentation at the Brunswick  
Society meeting in Orlando, FL**

**By**

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**November 2001**

Shanteau, J. (November, 2001). We are all Brunswikians (even if we don't always use the terms correctly). Invited presentation at the *Brunswik Society Meeting*, Orlando, FL.

## **We Are All Brunswikians** **(Even If We Don't Always Use the Terms Correctly)**

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**Egon Brunswik** was born in Budapest, March 18, 1903 and died on July 7, 1955.

“His childhood tongues were **Hungarian** and **German**. When only eight, he was sent to Vienna to be educated at the famous *Gymnasium of Theresianische Akademie* . . . He graduated from the *Akademie* in 1921 . . . In 1926 he passed the state examination for gymnasium teachers in **mathematics** and **physics**. After he received his PhD in 1927, Brunswik became an Assistant in **Karl Bühler's** *Psychologisches Institut* . . . He became Privat-dozent at the University of Vienna in 1934 . . . In the fall of 1937, he (came) to **Berkeley** as Assistant Professor, where through the normal course of events, he became Professor in 1947.

“ In the coming years, Egon Brunswik will hold an every increasingly significant and important position in the history of psychology . . . Those of us who knew and loved him can but be glad that such ever-greater recognition lies ahead, though we **grieve that he did not live to see it happen.**” (**Edward C. Tolman, 1956**)

“All those who knew Egon Brunswik agreed that he was a **brilliant man and an earnest scholar**. The question is – was he a brilliant man who **wasted his life on ideas so tangential and so unorthodox** that they could be of no use to the graduate student, the young professor, those who are carving the new face of psychology? Or did he **lay the groundwork for a new point of departure**, slow to be recognized but sure to be overwhelming in its final impact? **Only history, of course, can give the final answer.**” (**Kenneth R. Hammond, 1966**)

## Egon Brunswik in His Own Words

“ In problems of perception (i.e., perception and thinking) as well as of action, psychology in terms of objects would turn out to be a physical and biological science, being concerned in particular with all kinds of fairly well-established (i.e., fairly univocal), far-reaching, interruptable **causal couplings** between the classes of reactions on the one hand, and the corresponding classes of releasing, or effected, ‘attained’ types of (environmental) constants or events on the other.” (*Brunswik, 1936*)

“In fact, empirical investigations showed certain characteristic deviations from **univocality** which need for their precise representation a further differentiation of the conceptual system of objects in order to make possible a description of the **achieved relationships** in terms of their object ends.” (*Brunswik, 1937*)

“According to orthodox **Gestalt** theory, the effectiveness of these (Gestalt) factors rests on dynamic processes **inherent in the brain** field, rather than on accumulated past experience; while occasioned by respective characteristics of the stimulus-configuration which acts as a set of ‘topological’ factors at the boundary of the system, the dynamics themselves are in the nature of ‘**physical Gestalten**,’ that is, of a spontaneous physiological ‘self-distribution’ built into the organism prior to, and as a condition for . . . **learning.**” (*1953*)

“The perils of entrusting decision making to **linear single-cue** systems in which the throwing of a switch threatens collapse are brought home more in earnest when we remember that certainty-gearred interaction may go wrong not only as to deductive routines but also on the inductive leg of the inferential process. Take here the earlier confinement of **airplane altimetry** to the air-pressure cue, and the resultant **crashes of planes** in mountainsides whenever the cue was misleading.” (*1954*)

“Our thematic submissiveness to the physical sciences may be more readily overcome if we can show that the proposed reorientation would bring psychology closer to other, perhaps less glamorous but no less urgent or real, natural and social sciences in which **macroprobabilism** has long been recognized as a legitimate attitude.”

## The Language of Egon Brunswik

“The type of perceptual achievement called ‘**size constancy**’ may be said to constitute an evidence of the good focusing of the perceptual system on the independent objective character of physical objects as contrasted with its poor focusing on the projections, per se, of the objects upon the retina of a subject . . . ie, size constancy.” (*Egon Brunswik, 1944*) ==> **Brunswik Ratio.**

“The **compromise principle** is . . . as primordial as any theoretical principle in psychology proper is ever apt to become.” (*1951*)

“The dependability of cues may be defined by the statistical relationship between two environmental variables, as an **ecological validity** . . . If the study of the acquisition of perceptual cues is to be **representative** of natural conditions, the experimental design will have to duplicate the low dependability of the ecological relationships involved.” (*1951*)

“ . . . **vicarious functioning** of psychological cues and means may be viewed as a special case of receiving or sending messages through redundant, repetitive channels, thus reducing the probability of errors, that is, the set of possible causes, or effects, that could result in, or be reproduced by, the type of event in question. Vicarious functioning is thus indeed the essence of behavior.” (*1952*)

“All evidence may best be summarized by designating perception as **quasi-rational** rather than a rational system.” (*1952*)

“William James has spoken of perception as being of ‘probable things’; more recently, Thurstone has characterized perception as that function which is ‘based on insufficient evidence.’ The related conception of the perceptual system as **intuitive statistician** was to my knowledge first cast into mathematical language by Thorndike” (*1954*)

“The general pattern of the mediational strategy of the organism is predicated upon the limited ecological validity or trustworthiness of cues . . . This forces a probabilistic strategy upon the organism. To improve its bet, it must accumulate and combine cues . . . Hence the **lens-like model** . . . which may be taken to represent the basic unit of psychological functioning.” (*1955*)

## Present-Day Comments on the Language of Brunswik

“Estes’ . . . cited the 1939 paper (of Brunswik) as being ‘associated with the origin of the now popular term **probability learning**.’” (*Doherty, 2001*)

“The term **representative design of experiments** refers to the arrangement of conditions of the experiment so that they represent the conditions to which the results are intended to apply . . . Thus, he was arguing that the logic of induction should hold for conditions as well as subjects.” (*Kenneth Hammond, 2001*)

“The psychologists who ask for psychological studies to possess **ecological validity** (a theoretical term introduced by Brunswik that does not mean representative design) seem to be indicating that they wish that psychological studies offered more realistic representations of the environment that their subjects live in.” (*Hammond*)

“Psychologists made the unfortunate mistake of pursuing the generalizability of results by borrowing the wrong concept, namely, **ecological validity** . . .” (*Hammond*)

“**Cognitive Continuum Theory** goes beyond Brunswik’s consideration of interactions between strategies, rejecting any sharp dichotomy between **analysis** and **intuition**. Instead, it asserts that intuition and analysis constitute extreme modes of thought, and that a continuum of ‘quasi-rational’ processes occupies the middle ground between them.” (*William Goldstein & John Wright, 2001*)

“What most strongly united Brunswik and Gibson, and what set them apart from their contemporaries, was their focus on **achievement**, on veridical perception, on how it is even possible for behavior to be productive.” (*Alex Kirlik, 2001*)

“The specific impact of Brunswik’s monograph is difficult to establish in the context of the psychology of the 1950’s. Part of the reason may be that the monograph compressed too many of his ideas using **terse and precise language**.” (*Ray Cooksey, 2001*)

“He **never underestimated the intellectual abilities** of his audience, **nor would he compromise his ideas**.” (*Hammond*)

## **Egon Brunswik in the Eyes of His Contemporaries**

“In behaving, an organism, as Brunswik puts it, ‘intends’ and more or less successfully ‘conquers’ its environment. It operates on its environment by such intendings and conquerings.” (**Edward C. Tolman, 1936**)

“Brunswik has brought into the open new and important aspects (of psychological ecology) and I feel that their clarification may be helpful for psychological method in general . . . To my mind, the main issue is what the term ‘probability’ refers to.” (**Kurt Lewin, 1941**)

“I do not at all mean to imply . . . that Brunswik’s program of empirical correlation determinations is not without great scientific value. On the contrary, I believe that it is an extremely valuable mode of approach . . . My program thus does not oppose that of Brunswik, but merely attempts to supplement it.” (**Clark Hull, 1943**)

“Employing the terms of Brunswik, we may make use of either a proximal or distal account of the stimulus situation, and behavior may be described . . . in terms of gross achievements.” (**Kenneth W. Spence, 1948**)

“A certain amount of systematic controversy generated within psychology has been said to be the result of a failure to recognize the fact that different points of view will naturally follow from the acceptance of different basic premises and the use of varying theoretical and experimental approaches . . . Egon Brunswik provides a useful systematic framework that emphasizes the ‘conceptual focus’ of certain of the major systematic positions in psychology . . . ” (**Melvin Marx, 1951**)

“Brunswik emphasized the importance of the situation in all psychological prediction and called for systematic sampling of situations as an alternative to sampling individuals in a fixed or constant situation.” (**Julian B. Rotter, 1954**)

“Little critical concern has been evidenced, except by Brunswik and those influenced by his thinking, for either the theoretical or the methodological significance of the problem of representativeness.” (**William Bevin, 1955**)

## Comments by Influential Psychologists

“Brunswik realized more than his contemporaries that the problems of perception, as of behavior, cannot be solved setting up situations in the laboratory which are convenient for the experimenter but atypical for the individual.” (**James J. Gibson, 1957**)

“In both personal causality and perception we find what Brunswik has called a ‘wide-arched dependency’ of the terminal focus on the initial focus.” (**Fritz Heider, 1958**)

“Brunswik tried to answer basic questions of method and purpose that others have left implicit. His most important proposal was, I believe, that of ‘representative design’.” (**Julian Hochberg, 1962**)

“A major achievement of Brunswik’s perspective is that of maintaining a positivistic, behavioristic orientation without denying the flexible, purposive adaptedness which is characteristic of the perceptual and motor systems of higher organisms” (**Donald T. Campbell 1965**)

“Brunswik, in thinking about such attainments as size constancy and social perception, emphasized the importance of the ecology; he saw learning as a shift in the statistical structure of S’s responses to the ecology.” (**Lee J. Cronbach, 1966**)

“Brunswik has been especially concerned with the combining of stimulus cues, and has attempted to apply multiple regression analysis to the study of this problem.” (**Norman H. Anderson, 1974**)

JDM researchers have fallen into a trap – they believe “any individual’s mind is as much representative of the ‘generalized normal adult human mind’ as any other . . .” (**Ward Edwards, 1983**)

“Studies of unmotivated Ss and use of non-expert Ss are enshrined in psychological tradition . . . I have been in disagreement with this line of research for some time. I regret my own role in starting it (heuristics & biases) off in the early 1960’s . . .” (**Edwards**)

“Psychologists have failed to heed the urging of Egon Brunswik that generalizations from laboratory tasks should consider the degree to which the task resembles the context to which generalizations are made.” (**Edwards**)

## Is There a “Citation Bias”?

The Following Wrote Favorably of Brunswik’s Work

A Table of How Often They are Cited in “The Essential Brunswik”

| <b>Name</b>               | <b>Citations</b> | <b>References</b> |
|---------------------------|------------------|-------------------|
| <i>Norman H. Anderson</i> | 0                | 1                 |
| <i>William Bevin</i>      | 0                | 0                 |
| <i>Donald T. Campbell</i> | 2                | 2                 |
| <i>Lee J. Cronbach</i>    | 2                | 4                 |
| <i>Ward Edwards</i>       | 0                | 1                 |
| <i>James J. Gibson</i>    | 9                | 3                 |
| <i>Fritz Heider</i>       | 7                | 4                 |
| <i>Julian Hochberg</i>    | 2                | 2                 |
| <i>Clark Hull</i>         | 16               | 2                 |
| <i>Kurt Lewin</i>         | 13               | 1                 |
| <i>Melvin Marx</i>        | 0                | 0                 |
| <i>Julian B. Rotter</i>   | 0                | 0                 |
| <i>Herbert Simon</i>      | 2                | 4                 |
| <i>Kenneth W. Spence</i>  | 0                | 0                 |
| <i>Edward C. Tolman</i>   | 25               | 3                 |

## Is Brunswik Overlooked Today?

### Number of Hits for Five Internet Search Engines

| <b>Term/Phrase</b>           | <b>Low</b> | <b>Median</b> | <b>High</b> |
|------------------------------|------------|---------------|-------------|
| <i>Egon Brunswik</i>         | 105        | 173           | 325         |
| <i>Ecological Validity</i>   | 162        | 1,719         | 3,240       |
| <i>Lens Model</i>            | 997        | 1,550         | 2,420       |
| <i>Representative Design</i> | 104        | 602           | 861         |
| <i>Vicarious Functioning</i> | 3          | 18            | 55          |

Search Engines Used:

*Alta Vista, AOL, Google, Lycos, Yahoo*

## **Were Journal Editors Biased Against Brunswik?**

### **Journal Outlets for Brunswik's Work**

*Acta Psychologica*

*American Psychologist*

*American Journal of Psychology*

*Journal of Experimental Psychology*

*Journal of Personality*

*Journal of Unified Science (Erkenntnis)*

*Philosophy of Science*

*Proceedings of the 8th Congress for Psychotechnics*

*Proceedings of the 8th Congress for Philosophy*

*Proceedings of the 11th Congress for Experiment Psychology*

*Proceedings of the 11th Congress for Psychology*

*Psychological Bulletin*

*Psychological Monographs*

*Psychological Review*

*Scientific Monthly*

*Zeitschrift für Angewandte Psychologie*

*Zeitschrift für Psychologie*

## Is Anova/Factorial Design Bad? A Case Study

“Psychologists borrowed a **methodology** (from Fisher) that defeated its possibilities of inductive generalization beyond the specific conditions of the experiment.” (*Hammond & Stewart, 2001*)

Brunswikians argue that **factorial designs** and **Anova** are misused in psychology, preferring to use **representative designs** and **correlation/multiple regression** (MR) analyses instead.

*Phelps and Shanteau (1978)* asked 7 livestock judges to evaluate gilts (female pigs) using two methods: **factorial design/Anova** and “**representative**” **design/MR**. The former used word descriptions of gilts, whereas the latter used actual photos of gilts.

Our goal was to determine which **sources of information** were used by livestock judges in making their assessments.

Individual analyses with the **factorial design/Anova** revealed **9 to 11 cues** were significant for the 7 judges. For the **representative design/MR**, **less than 3 cues** were significant.

Followup analyses (eg, interviews) revealed that judges used a **hierarchical strategy** of specific cues to evaluate intermediate dimensions, that were in turn combined to make a final assessment: 11 cues are mapped onto 3 dimensions, that lead to 1 judgment.

Thus, it appears that factorial designs/Anova gave a **bottom-up** view, whereas representative design/MR gave a **top-down** view.

**Which is correct?** It depends on the research question.

## Multicollinearity: Friendly vs. Unfriendly Environments

The **Achilles Tendon** of MR analyses generally and SJT specifically is the problem of **multicollinearity**.

When cues are correlated, parameter estimates in MR become unstable. “In extreme cases, it may prove **impossible** to even get the MR weights.”  
*(Allen Edwards, 1979)*

An example of the problem with correlated cues was described by Shanteau & Thomas (2000) in simulation analyses of Fast & Frugal heuristics, such as **Take-The-Best** (TTB).

The effectiveness of TTB depended on whether the environment is “**friendly**” (positive cue intercorrelation) or “**unfriendly**” (negative cue intercorrelation).

For a **friendly** environment, TTB performed almost as well as an equal-weights (*Dawes*) model or optimal rank-sum weights model.

For an **unfriendly** environment, TTB was clearly inferior to the optimal model; however, the equal-weights model was even worse.

The bottom line: the results depend on cue intercorrelations – a very **Brunswikian** idea. Unfortunately, MR results (including SJT) are unstable under negative correlations.

As *McClelland (1978)* argued, multiattribute cues are necessarily negatively correlated for **non-dominated alternatives**.

## What I Learned About Brunswik

**Initial Starting Point:** Before reading *The Essential Brunswik*, I listed my initial conceptualizations of the Brunswikian approach. Some were confirmed, some were not.

### What I Already Knew:

Brunswikians are devoted and productive **advocates**.

Brunswik's **language** a problem – also for Wundt, Piaget, Gibson

Brunswikians pay no attention to **Dependent Variables** – why?

Anova seen as “bad” and MR as “good” – but both are from **GLM**.

The **multicollinearity problem** of MR and SJT is overlooked.

### What I learned:

Brunswik's concepts have been **assimilated** into common use.

**Original** Lens Model (with **feedback** arc) is surprisingly **modern**

Brunswik offers a needed **philosophy of science** for psychology

**Brunswikians differ**, as should be expected, in their views.

**Brunswik • SJT**. Also, **SJT • Original Lens Model**.

### Bottom Line:

I was surprised to discover that **I am a Brunswikian!**

But, I (& many others) don't use **language** of Brunswik **correctly**.

Also, I don't use SJT – I prefer **more powerful, robust tools**.