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Ecological Validity

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Ecological validity refers to the degree to which a given research context is indicative of, or can be generalized to, real-world environments. On the surface, ecological validity is a seemingly simple concept. In the definition above, the notion of *research context* encompasses the physical *setting* for the research; the information, or *stimuli*, experienced by research participants; the *responses* of research participants; and the observed *results* produced by the aforementioned components. As an example, a researcher interested in childhood aggression might argue that their work is ecologically valid if they looked at children's aggressive acts during free play on the school yard (the *environmental setting*), if they examined the interactions between children leading up to the aggressive behavior (the *stimulus*), or the actual physical act, and potential harm, of the aggressive behavior (the *behavioral response*).

Understanding ecological validity is critical for those designing and conducting experimental research as well as for those assessing such work.

History

The concept of ecological validity has been attributed to Egon Brunswik ([Brunswik, 1943, 1955](#)), who introduced the term to support his ideas related to the importance of *representative design* (described below) in experiments, in contrast to a more traditional or systematic approach to experimental design ([Kvavilashvili & Ellis, 2004](#)). Of the wide swath of literature addressing this idea, some of the more notable contributions to this concept can be seen in works (chronologically) by Kenneth [Hammond \(1954, 1998\)](#), Donald Campbell ([Campbell, 1957](#); [Campbell & Stanley, 1967](#)), Urie [Bronfenbrenner \(1977\)](#), Ulric [Neisser \(1982\)](#), Mark [Schmuckler \(2001\)](#), [Dhmi et al. \(2004\)](#), [Kvavilashvili and Ellis \(2004\)](#), [Holleman et al. \(2020\)](#), to name just a few.

Core concepts

In Brunswik's usage, ecological validity characterized the relation between proximal sensory information (data immediately available on the sensory receptors) and a distal object (the object that is perceived) in the world ([Brunswik, 1955](#)). Simply put, ecological validity measures the relation (e.g., a correlation) describing the probabilistic relation between proximal information and distal objects ([Holleman et al., 2020](#)). Brunswik considered that a correlation between such variables, such that one was able to act as a cue for the other, would determine the existence of *ecological validity* ([Brunswik, 1955](#)). This correlation does not necessarily apply specifically to experimental stimuli.

For an experimentalist, measuring the *organism–environment relation* requires that the stimuli be randomly sampled from the natural environment of the organism such that they are representative of the population of stimuli to which the experimenter wishes to generalize ([Dhmi et al., 2004](#), p. 959) [see [Affordances](#)]. Brunswik referred to this process as *representative design* ([Brunswik, 1955, 1956](#)). It is important to note the distinction between the concepts of ecological validity and representative design. The former describes the just-discussed relation between perceptual cues and the organism–environment relation, whereas the latter refers to Brunswik's methodological prohibitions necessary to

ensure the generalizability of psychological findings. It has been argued that, over the years, these ideas have become significantly conflated ([Hammond, 1998](#); [Holleman et al., 2020](#); [Kvavilashvili & Ellis, 2004](#)).

Questions, controversies and new developments

Early debates regarding ecological validity

Since its introduction, ecological validity has been a contentious topic, with Brunswik's initial discussion of this concept producing significant debate ([Kvavilashvili & Ellis, 2004](#)). In keeping with Brunswik's insights, [Neisser \(1978\)](#), suggested that the more traditional approach to memory research, one that relied on laboratory-based experimental research employing recognition and recall paradigms, had produced few new discoveries, had neglected practically significant and important questions, and had resulted in experiments conducted in settings and with materials far removed from peoples' natural environments. Unsurprisingly, this challenge generated strong reactions in defense of traditional laboratory-based approaches; this back and forth continued throughout the 1980s and 1990s ([Kvavilashvili & Ellis, 2004](#)).

Misuse of the term ecological validity

Although the nature of the debate has shifted over recent years, the intensity of the discussion has not especially diminished. One continual point of contention involves how the terms “ecological validity,” “representative design,” and even “generalizability” have strayed from their original usage, with multiple authors highlighting how “ecological validity” has been misused by researchers in their respective fields ([Araújo et al., 2007](#); [Dunlosky et al., 2009](#); [Hammond, 1998](#); [Holleman et al., 2020](#); [Kihlstrom, 2021](#)). This emphasis on the fidelity of the employment of terms with respect to the original usage is potentially problematic. Although producing consistency in how researchers refer to fundamental ideas in their fields is critical for ensuring that research debates are conducted with a common vocabulary, ideas inevitably evolve over time, with subsequent thought and discussion. Such evolution in ideas is not in and of itself problematic and enables the incorporation of new ideas and expanded meanings into such debates.

Ecological validity as a checkbox or a cudgel

Another point of debate involves a continued focus on using “ecological validity” to either affirm the viability of one's own research context or to undermine the research context of other investigators. In this sense, ecological validity is being employed somewhat superficially—either as a checkbox to affirm one's research or as a cudgel to denigrate the work of others. Such a framework runs the risk of sidetracking the development of scientific research generally, along with mistakenly and potentially rashly, rejecting research as not being ecologically valid ([Dunlosky et al., 2009](#); [Lewkowicz, 2001](#); [Schmuckler, 2001](#)).

Dimensional analyses of ecological validity

None of these issues should be taken to suggest that discussions regarding ecological validity are not useful. Indeed, discussions of this concept have frequently provided a deeper understanding of the

strengths and limitations of research contexts ([Dunlosky et al., 2009](#); [Fahmie et al., 2023](#); [Holleman et al., 2020](#); [Lewkowicz, 2001](#); [Schmuckler, 2001](#)). One characteristic common to these analyses is a concern with the dimension(s) upon which ecological validity is being evaluated.

One helpful shift has been a movement towards characterizing ecological validity multidimensionally ([Schmuckler, 2001](#)). This approach highlights the different dimensions on which the ecological validity of research can be classified ([Holleman et al., 2020](#)). One such approach ([Schmuckler, 2001](#)) has highlighted the relative importance of the experimental setting, the stimuli under investigation, and the observers' response measures as a function of the theoretical framework of the research. As an alternative example, others ([Holleman et al., 2020](#)) have emphasized that research is evaluable along continua including *artificiality–naturalness* and *simplicity–complexity*.

Broader connections

Debates regarding ecological validity continue to occur; indeed, some feel that this topic is experiencing a renaissance of interest. Although many authors continue to use the concept as a way of either accepting or dismissing particular research approaches, one encouraging trend has been the explicit attempt to describe and discuss issues of ecological validity for entire fields of research along the various dimensions proposed for this concept (e.g., [Andrade, 2018](#); [Fahmie et al., 2023](#)).

Acknowledgments

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