

LEVELING THE FIELD:
A COMMENT ON PERVIN (2008)

It is an honor to have the opportunity to comment on the scholarly essay of Pervin. It similarly has been an honor to join his text on personality theory and research (Cervone & Pervin, 2008), which for decades has been a bedrock of undergraduate instruction in the area.

As occurs often in Professor Pervin's work, in the present essay precisely the right question is asked. The concept of levels has gained great currency (e.g., McAdams & Pals, 2006). But what does it mean? What is a "level"? What isn't a level? Are any two explanations of the same phenomenon that employ non-identical terminologies potentially different levels of explanation, or does the notion of level lose meaning when defined so broadly? Such questions are at the heart of efforts to relate the psychological to the biological.

A particular virtue of Pervin's effort is his taking an unambiguous stand on the issue. (This cannot always be said of theorists in this area.) Pervin employs the term "level" to refer to cases in which "units at lower levels [are] embedded in units at higher levels but with the units at each level having distinct properties" (ms. p. 9).

As I read it, this conception valuably forces investigators to scrutinize their ontological claims. Though it may sound almost too obvious to state, for one entity to be embedded in another, the two entities must both exist. In making claims about levels, then, one must make claims about the existence of the entities that are discussed at the different levels of analysis. To say that subatomic and atomic particles exist at different levels, in Pervin's sense, is also to say that both classes of particles exist.

This obvious point can take a more interesting turn. There is more than one sense in which things "exist." As Searle (1998) discusses, objects can have an observer-independent existence or a socially-constructed, observer-dependent existence. The paper in your wallet contains carbon atoms whether

or not anyone looks into the matter. It has an economic value of \$1, however, only because there is a social world that agrees to this valuation. The carbon atoms and the monetary value both are real; they both “exist,” but not in the same sense of the word.

This distinction can be combined with Pervin’s definition of levels. To say that a lower-level unit is embedded in one of higher level would appear to entail the claim that the units not only exist, but also exist in the same way; that is, that either (a) both levels have observer-independent existence or (b) both levels have a socially-constructed, observer-dependent existence (perhaps within a social system that itself can be conceived as having different levels). If one were to mix the two notions of “existence,” the result would violate the normal sense of the word “embedded.” Here is an example. Computer programs vary in the degree to which they are easy to use. Computer programs possess structures; for example, “*if...then...*” structures or loops with “*Do...*” structures. It might be the case, empirically, that programs featuring a particular programming structure are more (or less) easy to use, on average. But, even if so, would one claim that programming structures “are embedded in” ease of use? I would think not—at least not if one wanted to preserve the normal meaning of the word “embedded.” The program’s “*if...then...*” loops have observer-independent existence (they exist whether or not users are aware of them). “Ease of use,” however, is socially constructed; there must be a society of users who experiences ease/difficulty of use. Although ease of use and programming structures are related empirically, they appear not to constitute “levels” as Pervin uses the term. This, I think, is a virtue of Pervin’s usage.

What are the implications for relating the psychological to the biological? The issue that becomes highlighted is the challenge of identifying psychological units—presumably the “higher” level—for which it is sensible to search for lower-level biological features that “are embedded in [the] units at [the] higher levels” (Pervin, p. 14). This question can be rephrased simply using a valuable terminology from Bennett and Hacker (2008): For what psychological units do there exist “bridge principles” that take us directly from the psychological to the biological, and back?

There are cases for which one can be confident that psychological qualities “bridge” to biology. Color blindness and deafness are examples. But what about agreeableness and goofiness? Do we search for biological underpinnings of boringness and does-taxes-at-last-minute-y-ness?

These odd questions are pressing because, hypothetically, if one compared the brains of the sober and the goofy, or the prompt tax payers and the last-second filers, they may differ. One might, then, be tempted to treat units such as (1) “goofy” and (2) region of interest X (the brain region in which differences were detected) as two levels of explanation for goofy behavior. The units surely have “distinct properties” (Pervin, ms. p. 9). Nonetheless, one actually would hesitate to say that the identified neural system is “embedded in” the psychological one.

There are, then, additional issue to resolve in determining whether units at one level can be said to be embedded in units at another. Pervin is right; things are “tremendously complex” (Pervin, ms. p. 12). He’s so right that things may be even more complex than he indicated.

How, then, can one identify psychological units of analysis that might bridge to biological ones, such that, at the end of the day, one can say that individuals (a) possess the psychological quality, (b) possess the biological feature, and (c) there is a consistent conceptual bridge between the two? Answering this question is far beyond the scope of this commentary. Yet we can identify an important consideration in answering it. Recent work highlights the distinction between inter-individual and intra-individual units of analysis (e.g., Borsboom, Kievit, Cervone, & Hood, in press). The key idea is that some units of analysis (and claims made using those units) pertain to populations and inter-individual differences in populations, but *not* to psychological structure at the level of the individual case. Here’s a simple example.

Suppose that a self-report test of agreeableness (a commonly identified factor in factor-analytic models of inter-individual differences in personality) is administered to populations of identical and fraternal twins. Analyses might indicate that the heritability of agreeableness is 45%. However, if we were to explore the life of any one individual in the population, it would not make sense to say that 45% of that one person’s agreeableness is due to genetics. The numerical estimate pertains to variation in the population, not to the life of the individual. Furthermore, the unit of analysis, agreeableness, pertains to the population. It is a latent variable that summarizes observed variation between persons in the population at large. The inter-individual data do not permit one to claim that all individual persons possess (a given level of) agreeableness.

The explicit recognition of these facts—that both the heritability coefficient and the construct itself derive from between-person, not within-person,

analyses—forestalls potentially misguided efforts to relate psychology to biology. One would not attempt to identify a universal (intra-individual) biological structure that is embedded in agreeableness, since agreeableness itself is not an intra-individual psychological structure.

What, then, are psychological units of analysis that safely can be said to exist at the level of the individual? As Pervin implies, the qualities of temperament identified by Kagan (2003) and the cognitive capabilities analyzed by Bandura (2001) are good bets. Models of cognitive architecture (e.g., McClelland & Rogers, 2003) provide additional guidance, as do (I hope) models of personality architecture (Cervone, 2004).

As Professor Pervin knows as well as anyone, when trying to relate levels of analysis to one another, one encounters as many challenges at the psychological level as the biological.

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