

nets. But this mandates a separation of person and world, scientist and fact, such that one assumes that fish exist a priori and independent of the scientist's investigation. Organisms, however, shape their worlds as their worlds reciprocally shape them (Lewontin, 2000). Thus, the scientist who clears land on his or her property for a new tennis court will create the circumstances of a world lacking fish as facts for discovery.

Cacioppo et al. (2004) should be credited for bringing attention to the different consequences of the approaches of scientific realism and instrumentalism. It is ironic that they are inadvertently encouraging psychologists, even as a practical lot, to consider the entailments of metatheoretical assumptions. Unification without regard to these assumptions is like appealing for the unification of Christianity, Judaism, Islam, Buddhism, and atheism. However, it is a disservice to the field of psychology to pretend that realism and instrumentalism constitute an exhaustive dichotomy, especially one whose resolution entails progress toward scientific truths. If there is to be an iterative deployment of differing epistemological and methodological practices, then one should begin to recognize the significant differences between a psychology informed by scientism and one informed by humanism/phenomenology, specifically with regard to the place of the human being as both scientist and subject. Public policy and scientific practice cannot devalue or ignore the concept of human being. Although the appeal to scientific realism may support one's anxieties and desires to legitimize the discipline of psychology, it imposes an acceptance of the reducibility and measurement of human beings, when human being is a concept that cannot be measured. Reality consists of the co-presence of organisms and the objects to which they tend, each term mutually exclusive, and realism is the study of the emergent understanding of this dialectic.

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## Scientific Symbiosis Represents the Mutual Benefit of Iteratively Adopting the Perspective of Realism and Instrumentalism

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We wrote "Realism, Instrumentalism, and Scientific Symbiosis: Psychological Theory as a Search for Truth and the Discovery of Solutions" (Cacioppo, Semin, & Berntson, May–June 2004) from the viewpoint of practitioners of science who believe that the perspective of scientific realism, which many contemporary psychologists have simply inherited, may now place unnecessary constraints on theoretical developments in psychology. In this belief, we are clearly at odds with Haig (2005, this issue), who argued that "realism alone can serve as a sufficient philosophy for psychology" (p. 344). Haig faulted our characterization of realism as being noncomprehensive. Of course, our intention was not to provide a comprehensive review of the variations on scientific realism but to describe some of its core features and to consider their implications for how psychologists think about, formulate, and evaluate psychological theory. Haig argued for one particular version of realism (evolutionary naturalistic realism, or ENR), but he acknowledged that the core features we described apply to ENR as well.

We recognize that reasonable people can disagree on which philosophical perspective they prefer. We further believe that theory and research in psychology would benefit from the explicit consideration of this question rather than, as is currently the mode, accepting realism without considering alternatives.

Haig (2005) criticized our proposed symbiosis because the suggested perspective "will confuse psychologists rather than provide them with effective understanding and guidance" (p. 345). Psychologists have long addressed complex problems with intelligence, sophistication, and clarity. We

therefore respectfully disagree that our perspective would simply confuse psychologists who chose to give it serious consideration.

The divide between our proposals and those of Lau (2005, this issue) and Ramey and Chryssikou (2005, this issue) are less dramatic. We anticipated that we would stir some controversy. What we did not expect is that some readers would conclude that we were advocating scientific realism (Ramey & Chryssikou, 2005) while others would conclude that we were advocating scientific instrumentalism (Lau, 2005). In point of fact, we did not exclusively embrace either.

We suggested that among the strengths of scientific realism is its tendency to foster theoretical rigor, verifiability, parsimony, and debate, whereas among the strengths of instrumentalism is its tendency to promote theoretical innovation, synthesis, generativeness, and scope. We proposed that the benefits of both might be achieved by the appropriate iterative application of each when thinking about, formulating, and evaluating psychological theory. We termed this perspective scientific *symbiosis*.

Symbiosis between organisms does not imply an averaging that would be unfaithful to the two organisms. Nor does symbiosis imply the morphing of the organisms—the emergence of a new organism—or a relativistic position. Symbiosis refers to an interaction between two different organisms to the advantage of both, or to a mutually advantageous association or relationship. A symbiosis between two approaches does not require the emergence of an approach that is fundamentally different from either. The criticisms of Ramey and Chryssikou (2005) and Lau (2005), therefore, would seem more appropriate had we proposed a synthesis or a unification of realism and instrumentalism rather than a symbiosis.

By analogy, scientists benefit from appropriately applying both inductive and deductive reasoning to the problem of scientific inquiry. The appropriate and iterative application of induction and deduction in science might reasonably be described as symbiotic because the accrual of knowledge (the endpoint of inductive and deductive reasoning) benefits from their iterative application in the scientific method. Similarly, we proposed that psychologists might bring both realist and instrumentalist perspectives to bear on theorizing in science to achieve a scientific symbiosis within the theoretical domain. Our intention in this proposal was not to advocate scientific realism or scientific instrumentalism over the

other within the conceptual domain any more than the scientific method advocates inductive or deductive reasoning over the other when mapping between the conceptual and empirical domains. Having said this, we agree with Lau (2005) that our proposal marks only a beginning and that additional examinations of ontological and epistemic assumptions may produce other forms, perhaps even better forms, of scientific symbiosis. To stimulate or contribute to such a pursuit is all that one could hope to achieve.

Finally, Ramey and Chryssikou (2005) stated that “public policy and scientific practice cannot devalue or ignore the concept of human being. Although the appeal to scientific realism may support one’s anxieties and desires to legitimize the discipline of psychology, it imposes an acceptance of the reducibility and measurement of human beings, when human being is a concept that cannot be measured” (p. 348). We, as scientists, would neither deny nor devalue the concept of human being. Indeed, we seek to measure it, as that is a prerequisite for empirical science. As with all scientific concepts, one measures operationalizations of concepts, and as with all complex scientific concepts, the measurement of multiple operationalizations may be required. Measurement, perhaps, is not necessary for all human understanding, but for an empirical science it is. If, as Ramey and Chryssikou asserted, the concept of human being cannot be operationalized and measured, then it is not within the domain of empirical science, and it is not subject to scientific theory. However, many dimensions of human existence and human behavior can be measured, and to these extents, the concept of human being is itself subject to scientific investigation.

We agree with Ramey and Chryssikou’s (2005) assertion that subjectivism may color a scientist’s understanding of phenomena under investigation. The division of knowledge into disciplines reflects the limits of human capacities, and the specific aspects on which scientists choose to focus are an expression of expectations and values. However, among the measurable qualities in psychological science are the beliefs and values that scientists bring to bear in their inquiries. The effects of such beliefs and values on their theory and behavior can themselves be subject to scientific scrutiny.

In sum, we appreciate the thoughtful commentaries and hope readers agree that they raise important questions and point to worthwhile literatures beyond what we could cover. We also hope that these commentaries underscore the importance, espe-

cially for students who hold the future of psychology in their hands, to take time to consider the effects of the philosophical perspective they inevitably bring to their scientific inquiries and perhaps even to revisit this choice periodically to ensure that the theoretical return on their scientific investment is optimized.

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## Giving Psychology Away Is Expensive

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We deeply appreciate the documentation and inspiration provided by Zimbardo (July–August 2004) on how psychology is reaching out to the public by “giving psychology away” (p. 340). We totally agree that psychology has much, much more to offer that could be used to improve human lives.

We believe that in addition to a sincere desire to give psychology away, there needs to be a recognition of the realities of living in a capitalist society. In a market-driven economy, it is the value of intellectual property in the form of revenue generated that will determine whether psychological knowledge is widely disseminated and used. Zimbardo (2004) made a very good case for using the media to obtain free advertising; however, we believe a more radical approach is needed.

Giving psychology away has only occasionally worked. Giving anything away in a market-driven society is difficult, because it costs a significant amount of money to inform people about a product and to convince them that the offering is of value. Giving a product away does not remove the need for advertising or some kind of teaching or training because a person must still understand how a product is personally valuable and must learn how to use it. Giving psychology away generates no revenue to cover advertising or teaching costs.

An example from psychology illustrates the point that a fine product freely available loses out to a product that is sold and so has the funds to advertise. Altus (1948) developed a brief intelligence scale using sample sizes in the thousands. The resulting Information Inventory takes only a couple of minutes to give and score and is easily memorized. Follow-up research has confirmed its quality (Gorsuch & Spielberger, 1965; Moon & Gorsuch, 1988). Yet the instrument is practically unknown and seldom used.

In our teaching in a graduate clinical psychology program, we have given away the Information Inventory to students for their use. Instead, they generally use the Quick Test (Ammons & Ammons, 1962) despite that the Information Inventory is faster, correlates better with the full-scale Wechsler Adult Intelligence Scale, and has better norms than the Quick Test (Moon & Gorsuch, 1988).

We can see one major reason why the Quick Test is used more than the Information Inventory. Each year the company promotes the Quick Test with a mailing to most psychologists. They can afford that advertising because the Quick Test is protected by copyright and sold. The company is promoting the test very effectively.

Several publishers have been approached about selling the Information Inventory. After initial high interest, they drop the conversation. They note that after selling a manual too short to generate much revenue, the user would never need to buy anything more. Therefore there is too little revenue to support advertising.

Perhaps the lack of a way to generate revenue and thereby advertising is a reason why well-replicated and useful established psychological principles—such as the curvilinear relationship between motivation and performance as a function of task complexity (Yerkes & Dodson, 1908 [also found to underlie, e.g., the social facilitation effect])—are so little known. Unless there is a way to cover the costs of taking psychology to the people who can use it,