



Anxiety-linked attentional bias and its modification: Illustrating the importance of distinguishing processes and procedures in experimental psychopathology research[☆]



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ABSTRACT

In this review of research concerning anxiety-linked attentional bias, we seek to illustrate a general principle that we contend applies across the breadth of experimental psychopathology. Specifically, we highlight how maintenance of a clear distinction between process and procedure serves to enhance the advancement of knowledge and understanding, while failure to maintain this distinction can foster confusion and misconception. We show how such clear differentiation has permitted the continuous refinement of assessment procedures, in ways that have led to growing confidence in the existence of the putative attentional bias process of interest, and also increasing understanding of its nature. In contrast, we show how a failure to consistently differentiate between process and procedure has contributed to confusion concerning whether or not attentional bias modification reliably alters anxiety vulnerability and dysfunction. As we demonstrate, such confusion can be avoided by distinguishing the process of attentional bias modification from the procedures that have been employed with the intention of evoking this target process. Such an approach reveals that procedures adopted with the intention of eliciting the attentional bias modification process do not always do so, but that successful evocation of the attentional bias modification process quite reliably alters anxiety symptomatology. We consider some of the specific implications for future research concerning attentional bias modification, while also pointing to the broader implications for experimental psychopathology research in general.

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The discipline of clinical psychology has carved a distinctive position within the health sciences through its long-standing commitment to productively fusing science and practice. Embracing the scientist practitioner approach has ensured that theoretical progress within this discipline has been guided by the goal of illuminating the mechanisms that underpin psychological dysfunction, while intervention approaches have been soundly based on the resulting knowledge of candidate causal mechanisms. In consequence, the efficacy of these interventions (or lack thereof) has, in turn, further informed theoretical understanding. While the power of this fusion is undeniable, and is well-evidenced by the

extraordinary growth in both the scale and impact of clinical psychology across the half century since the concept of the scientist practitioner was first collectively embraced by the discipline at the Boulder Conference in 1949, this growth has steadily broadened the subject matter of clinical psychology. In an era when journals are now becoming increasingly specialized, there are grounds for concern that an ill-considered approach to the segmentation of this broad content across clinical psychology journals could threaten the integrity of the vital connection between basic research designed to illuminate the dysfunctional processes that give rise to psychopathology, and applied research designed to develop and evaluate candidate clinical interventions procedures that may attenuate psychopathology. Such disconnect is not an inevitable consequence of journal specialization, but instead depends upon the precise manner in which journals impose divisions on the field. Thus, for example, journals that specialize in particular forms of psychological dysfunction can readily sustain a breadth of coverage that preserves a strong connection between the fundamental investigation of basic processes that give rise to clinically-pertinent

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symptoms, and applied research that evaluates the therapeutic impact of intervention procedures designed to evoke a change process that may alleviate these symptoms. However, when specialization leads to supposed clinical psychology journals defining as beyond their scope of interest research designed to illuminate such basic processes, to focus instead only on studies that evaluate the outcomes of intended therapeutic procedures, then this threatens the bond between fundamental science and applied practice upon which our discipline is built.

Behavior Research and Therapy (BRAT) is to be commended for having resisted the temptation to specialize in this simplistic and potentially damaging manner. For over 50 years BRAT has served, instead, to progressively strengthen the bridge between basic science and therapeutic practice, amply delivering on the promise originally voiced by Hans Eysenck in his editorial to the first issue, assuring that “contributions will stress equally the application of existing knowledge to psychiatric and social problems, experimental research into fundamental questions arising from attempts to relate theory to maladaptive behavior, and high level theoretical attempts to lay more secure foundations for experimental studies” (Eysenck, 1963, p. 1). This invaluable legacy is now passing into the care of a new Editor, and editorial team, whose outstanding research careers vividly demonstrate the power of tightly integrating the experimental study of basic mechanisms with practice-oriented outcome evaluation research. We are delighted to contribute the present review of our own research field to mark this important occasion. While the content of our review will focus on work concerning the involvement of attentional bias in anxiety vulnerability and dysfunction, we hope that it demonstrates how laboratory research, motivated by the goal of illuminating basic mechanisms that plausibly contribute to clinically-pertinent phenomenon, can serve to establish a firm foundation for field-based research evaluating the therapeutic impact of interventions intended to alleviate clinical dysfunction by targeting these mechanisms for change. In this review we place special emphasis on the critical importance of maintaining a clear distinction, in experimental psychopathology research, between the psychological processes of interest and the procedures adopted by psychologists in their efforts to assess or to influence these processes. If this distinction becomes blurred, then theoretical understanding can be adversely affected, and the advancement of therapeutic practice is likely to be compromised.

1. The importance of distinguishing process from procedure in experimental psychopathology research

Experimental psychopathology researchers seek to understand and modify the processes that underpin psychopathology, and achieving these twin objectives requires that they must develop and deploy effective procedures. *Processes* must not be confused with *procedures*. Processes represent psychological operations, while procedures are sets of actions taken by the investigator, most often with the goal of measuring or manipulating processes. It is appropriate to distinguish two subsets of processes that commonly are of relevance to the experimental psychopathologist, each of which is related to a distinctive subset of procedures. One such subset concerns the psychological processes that operate to produce and/or maintain the dysfunctional symptomatology of interest, which will here be labeled “*pathological processes*”. The other subset concerns the change processes that operate to modify psychological functioning, perhaps with attendant consequences for dysfunctional symptomatology. We will label these “*change processes*”. While these two subsets of processes, distinguished in the top row of Fig. 1, operate within the psychological system, each is aligned with a certain type of procedure adopted by clinical psychologists with an interest in that particular subset of processes, as

Pathological Processes	Change Processes
Pathological Process Assessment Procedures	Intended Change Process Evocation Procedures

Fig. 1. The process and procedures pertinent to experimental psychopathology research.

shown in the bottom row of Fig. 1. Researchers with a primary interest in advancing knowledge and understanding of the pathological processes that underpin psychological dysfunction commonly engage in the development and refinement of procedures intended to measure the candidate pathological processes putatively implicated in the production of core maladaptive symptoms. We label these “*pathological process assessment procedures*” in Fig. 1. In contrast, researchers with a primary interest in directly attenuating psychopathology develop and deploy procedures intended to evoke the specific change process that they anticipate will yield therapeutic benefits. In Fig. 1 we label such procedures “*intended change process evocation procedures*”, and novel candidate interventions belong to this category of procedure.

Meaningful progress in the field of experimental psychopathology depends critically upon maintaining a firm understanding of the vitally important relationship between the four elements identified in Fig. 1, which must not be confused. To illustrate the need to keep a clear distinction between procedure and process, consider first the leftmost column of Fig. 1. Recognition that understanding is compromised by failure to differentiate between the processes that researchers seek to assess, and the procedures adopted with the aim of assessing these processes, is evidenced by the frequency with which contemporary investigators continue to lampoon the early claim that intelligence is whatever intelligence tests measure (Boring, 1923). It is now widely accepted that the data resulting from assessment procedures, intended to measure candidate processes, are not themselves the process of interest. It is because of this recognition that investigators must always seek to identify the limitations of existing assessment procedures, and to continuously refine them. In consequence, our assessment procedures become progressively more powerful, and their capacity to assess increasingly precise aspects of processing permits the development and evaluation of ever more specific hypotheses concerning the nature of putative pathological processes thought to underpin dysfunctional symptoms. In our review of the attentional bias literature we will endeavor to illustrate this interplay, by showing how the refinement of assessment procedures designed to measure anxiety-linked attentional bias, and the advancement of understanding concerning the specific nature of these attentional processes, have progressed hand in hand to illuminate the patterns of attentional selectivity that characterize heightened anxiety vulnerability and dysfunction.

The type of experimental psychopathology research associated with the left column of Fig. 1 serves, through the development and deployment of sensitive assessment procedures such as

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