

Psychological Set: Its Origin, Theory And Application

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Abstract

In 1960, Cleve Backster used the term *psychological set* to explain anti-climax dampening, the basis for his Zone Comparison Technique. Since then, the term has been attributed to Backster in numerous articles pertaining to polygraph. Backster however has always attributed its source to a *Psychology and Life* textbook by Floyd L. Ruch (1948). Recently (Honts 2000; Krapohl 2001) the term *psychological set* has been questioned as a non-scientific or non-modern term, an embarrassment to the scientists trying to explain the 'real' basis of anti-climax dampening. This paper sets forth the historical origins of its application to forensic psychophysiology and shows how *psychological set* continues to be widely used and regarded in contemporary psychological, industrial/organizational and legal/political science communities.

Keywords: psychological set, selective attention, theory

Background

In 1960, Cleve Backster, in a school handout, described anti-climax dampening as follows:

Anti-climax dampening effect involves the inter-relationship of two issues, questions, or topics, in close proximity to each other, where the more important, bothersome or stimulating issue suppresses or completely eliminates emotional response to the other issue, question or topic which the person might have responded to had the other stronger issue, question or topic not been present.

Anti-climax dampening was described as an effect based on natural psychological phenomena associated with attention and set. Backster defined attention as 'readiness to respond to stimuli.' Set was 'an adjustment of an organism in preparation for a certain kind of activity.' Next he gave the definition of *Psychological set* found in a widely-used

textbook *Psychology and Life* by Floyd L. Ruch (1948).

Ruch clearly and elegantly defined psychological set in the following way:

From all the energies about us, our sense organs select only certain ones. The others are tuned out just as effectively as we tune out the voice of one speaker on the radio so that we may hear that of another. But the selectivity of the human organism goes far beyond physiological selectivity—a heightening or lessening of responses to certain stimuli within range—or its lack of, in the sense organs. This selectivity is more than sensory. Although several stimuli compete, only those fitting the need of the moment are selected. For example, when you are deep in an interesting conversation the sounds of traffic noises outside are not heard.

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Thus the term *psychological set* was introduced by Backster to the polygraph field 42 years ago. Since then the discipline of forensic psychophysiology (ASTM 1999) has emerged, infused with knowledge brought by scientists from behavioral and medical disciplines never dreamed of in those early years. Yet in spite of Backster's declaration that he acquired the term from a book on psychology (Ruch 1948), the polygraph community has generally attributed Backster as the source of that term, while others (Honts 2000; Krapohl 2001) have questioned the scientific basis, definition and applicability of that term, regardless of who inserted it into our discipline.

Honts (2000) was very clear on his reservations: "The notion of *psychological set* is a contrivance of the polygraph profession and has received little scientific validation. Moreover, *psychological set* is not a term that is currently much used in mainstream psychological science. While the hypothetical construct, *psychological set*, may have some heuristic value as a descriptive tool, it has no reality in science or the real world."

Krapohl (2001) acknowledges the use of the term in the past, but yearns for a more modern, less antiquated term than *psychological set*: "As for the expression *psychological set*, in the mainstream literature it relates to expectancies, not attention. The research goes back to the 30s, and there is a lot of it. Our profession cooped the term for our use. We at DoDPI are looking for a substitute term, one that corresponds with the rest of the psychological sciences, but it will take a while. In the meantime, it is only a borrowed term." Note that Krapohl (2001) assumes *psychological set* is biased toward expectancies, and away from attention, as if expectancies were not as relevant to polygraph examinations as was the concept of selective attention. Yet during the early 1960s, Backster himself authored several articles pertaining to the Backster Zone Comparison Technique wherein he used the term *psychological set* interchangeably with "attention set" (Backster 1962).

Others in the polygraph community have embraced *psychological set* as fundamental to understanding polygraph protocols. For example, as early as 1965, the United States Army Military Police School (USAMPS) Department of Resident Instruction's Summary Sheet¹ articulates "The Psychological Theory of The Polygraph Examination" and the basis of "The Backster Zone Comparison Technique." It further defines the *psychological set* as follows:

"2. Psychological Set.

a. A person's fears, anxieties, and apprehensions are channeled toward the situation which holds the greatest immediate threat to his self-preservation or general well being. He tunes in that which indicates trouble or danger by having his sense organs tuned for a particular stimulus, and he tunes out that which is of a lesser threat to his self-preservation or general well being. In other words, he establishes a *psychological set*.

b. *Psychological set* is selective in nature and depends upon the present frame of reference."

"4. The Anticlimax Dampening Concept.

a. The anticlimax dampening concept is based on the theory of *psychological set*.

b. In a series of questions containing a relevant and a control question, the guilty (lying) subject will tune in the relevant question and out the control question, and the innocent (truthful) subject will tune in the control question and out the relevant question.

c. If a series of relevant questions are asked during a test, the guilty (lying) subject will direct his attention to the most intense relevant question. He will basically perceive but may not be materially affected by the weaker relevant questions, i.e., he may tune them out.

¹ USAMPS Polygraph School's 1963 Summary Sheet Introduced the Backster Zone Comparison Technique and defined the term *Psychological set* and Anti-Climax Dampening.

d. Backster calls this tuning out of the weaker relevant questions the anticlimax dampening concept."

Apparently *psychological set* has become an important concept within much of the polygraph community because no one has provided an alternative concept that so closely links the importance of the preparation for the exam to specific procedures which if violated negate achieving a valid and reliable result.

Psychological Set in Contemporary Psychology

"Set" is widely used throughout modern psychology and even psychophysiology. Psychologists have prefixed the term "set" with such qualifiers as 'perceptual,' 'preparatory,' 'attention' as well as 'psychological.' These qualifiers determine their meaning and definition. For example the term "set" is defined in the *Penguin Dictionary of Psychology* (Reber 1995) in a number of ways, depending on the qualifiers:

"1. n. A classification, aggregate or series of things sharing some defining property or properties such that they can be regarded collectively. This general meaning encompasses a variety of uses from the purely mathematical characterization embodied in set theory, through the more common-sense denotations such as the set of respondents to a questionnaire, the set of stimulus items in an experiment, the country-club set in upper-class society, etc. Note that sets may be infinite in size (the set of integers), finite (the set of correct answers on a multiple-choice test), empty (the set of immortal persons) or poorly defined (the set of all young persons. See here *fuzzy set*)."

"2. n. Any condition, disposition or tendency on the part of an organism to respond in a particular manner. Note that the term 'respond' here may encompass a number of acts. Thus, one may have an attentional or perceptual set for particular kinds of stimuli (see here *Einstellung*), a task-oriented set for a problem (see here *Aufgabe*), a functional set which directs the manner of use of objects (see here *functional fixedness*), a muscular set in which a particular motor act is optimized (preparatory set), etc. To distinguish among

these various uses many authors will use qualifiers, as in some of the following entries. It should also be recognized that the term is generally used with the connotation that the set under consideration is a temporary (although potentially recurring) one and, as such, its meaning is contrasted with terms like habit and trait, which refer to enduring dispositions or conditions, and distinguished from schema (1), which is used for more general orientations to situations. The longer term determining set is often used synonymously for 2, particularly for sets that exert some measure of control over how the organism is to respond. adj. set; vb. (for 2), set." (underlined text by the authors)

Note the last sentence in this definition of "set" by W. F. Hill (1970) as "Transfer may be from either recent or more distant experience. The effects of very recent experience are often spoken of as a set. When a person fails to solve a problem because he has recently used the essential tool in its familiar way, or because he has just solved a series of problems with a formula that will not work in the present situation, he is exemplifying set. Set may also be manipulated by telling him something that biases him either toward or away from the correct approach." (underlined text by the authors)

C. G. Morris (1973) explains "Apart from these emotional factors, two other things may affect your ability to solve a problem. These are set and functional fixedness. You usually approach a problem with some sort of direction or expectation which is the result of experience. This is a set - a kind of habit, the way you are used to perceiving certain situations. The value of previous experience in problem solving is that you have learned certain methods or ways of perception in the past, and you can apply them to the present situation. In the example of the conflicting appointments, one set you might have is that it is not polite to break appointments. Without that set, our solution might have been just to go off to the tennis court and forget the dentist entirely. A set can function as a 'hint' toward the solution to a problem." (underlined text by the authors)

Hence it can be seen that it is the prefix qualifier to "set" that determines the

ultimate definition of the whole term, i.e., functional set, muscular set, perceptual set, attention set, mental set, or psychological set.

It should be noted that in England the use of the term *mental set* in lieu of *psychological set* was the preferred term since the 1940s. It is alive and well today. For example, the recent use of *mental set* is described in "Processing in the Stroop task: Mental set as a determinant of performance." (Bauer & Besner 1997). It reads in part as follows:

"Subjects took part in a Stroop experiment in which they responded to the print color of an irrelevant word that spelled a congruent or incongruent colour word. In the CLASSIFY condition, subjects were instructed to map one colour to one response button and the other colour to another response button. In the DETECT condition, subjects were instructed to signal the presence of a target colour with one button, and its absence with a different response button. The CLASSIFY instructions produced the standard result: The incongruent condition was slower than the congruent condition. In contrast, there was no Stroop effect given DETECT instructions. These results are discussed in terms of *mental set* as an important determinant of processing, and contrasted with the received view that reading the irrelevant word is largely 'automatic' and virtually always results in a 'Stroop Effect.' Hence *mental set* is not expectation or attitude, but a disposition to respond to an immediate situation by filtering out irrelevant stimuli. This is similar to the definition of *selective attention*, "(t)he process involved in situations in which one is confronted with multiple stimulus inputs and must select but one aspect of them and attend to it." (Reber 1995).

Interestingly, the term "selective attention" as defined in the contemporary text, *Abnormal Psychology* (Bootzin, et al 1993) appears to be synonymous with "psychological set" as defined in *Psychology and Life* (Ruch 1948). An excerpt from *Abnormal Psychology* is quoted below:

"ATTENTION: When the mind takes in only some of the information it is exposed to, it is engaging in *selective attention*. *Selective*

attention is an indispensable adaptive function. We cannot possibly attend to, let alone process, all the information that impinges on our faculties at any given moment. So we focus on what seems to us most important and filter out the rest."

A significant number of research studies have been published within the recent past that clearly validate the *selective attention* concept. (Eimer Jan 1996 and Aug 1996; Freedman et al 1987; Garcia-Larrea et al 1995; Haken 1998; Kappas et al 1997; Kropotov et al 1997; Lorist et al 1996; White et al 1997; Ward et al 1996; Trejo et al 1995; Karayannidis et al 1995; Kenemans et al 1995; LaBerge 1990; Treisman 1998; Van Der Molen et al 1996; and Woldorff et al 1998).

Of course, *psychological set* did not originate from Ruch (1948). It should be recognized that the term *psychological set* was used by Titchener to describe the gelling of attitudes and beliefs in 1914. In both America and England (*psychological set* was called *mental set*), research on *psychological set* blossomed in the 1950s in two areas: Cognitive Sciences and Industrial/Organizational/Political (Applied) Psychology.

In the Cognitive Sciences, *psychological set* was a cornerstone of the new discoveries about reification (the mind's natural tendency to simplify and categorize events). Difficulties in cognitive flexibility are attributed to functional fixedness, a sub-category of *psychological set*.

In Applied Psychology, *psychological set* is used to integrate diverse findings of human tendencies towards manipulation, prejudice, persuasion, and even brainwashing (see 1977 Senate Hearings). Advertisers and marketers study *psychological set* to sell products; political reformers study *psychological set* to explain cognitive dissonance and psychological profilers study *psychological sets* to explain deviant behaviors.

As noted in above (1977 Senate Hearings), *psychological set* was used by law enforcement to help explain narco-interrogations. Even today, *psychological set* is used to explain how people shift their focus based on their background, knowledge and

experience. The applications of *Psychological set* theory today are diverse; we know some sets are inflexible (functional fixedness) and others seem to be more malleable, based on immediate needs (consumer preference sets in marketing studies).

Forced Choice and Psychological Sets

It is quite apparent that Backster did not invent the concept of *psychological set*. His application of *psychological set* to forensic psychophysiology using the polygraph was unique, but a logical application of two other then-new discoveries: (1) The double-bind effect, and (2) cognitive dissonance.

Double-Bind Effect: Backster's concept of focusing the issues to clearly establish one of two mutually exclusive *psychological sets* is similar to another discovery in cognitive sciences, the double-bind effect. Backster's method clarifies immediate threats to being deceptive to one of two situations: Lying to the relevant issue or lying to the control issue. A guilty person can lie to both, but is more threatened by the crime-related lie (Anti-climax dampening). In double-bind studies, a situation is constructed where only two escapes are obvious (other options are logically possible, but not allowed). For example, you can be truthful or you can lie; this restricts your obvious choices to only two - a double-bind. Under clear double-bind conditions, persons make forced choices based on Fechner's Law of Least Resistance - taking the easy way out.

Cognitive Dissonance: Set choices are not just based on the options available; choices are

also influenced by the stakes involved in each choice. Festinger found that in double-bind situations where the stakes were high, people often developed cognitive dissonance (c. 1953), holding more firmly to beliefs proven wrong later. This sounds like the opposite of Anti-Climax Dampening, but in fact it is Backster's complimentary concept of Dampening Outside Issue,² a way of dampening the fear of any other issue outside the double-bind.³ Persons hold to an old belief in part because they share a wider belief that outsiders do not really understand (as perhaps in Ruby Ridge). Cognitive dissonance is based on the link between the belief about a specific event and the threat of abandoning that belief, creating a conflict resolved by outside issues, not the specific issue. In forensic psychophysiology failure to account for the threat associated with outside beliefs will negate the desired double-bind effect about the target issue, as Backster had predicted.

In summary, Backster's synthesis of the concept of *psychological set* is entirely consistent with the latest thinking and a long tradition in academic psychology and forensic sciences. Furthermore, as shown above, the definition of the term *psychological set* by Ruch (1948) is consistent with the definition of the contemporary term *selective attention* by Bootzin et al 1993, a current, validated psychological concept. Hence *psychological set* remains alive and well in its continued role within Backster's Anti-Climax Dampening Concept. The polygraph community should be proud to embrace it as fundamental to all scientifically-based protocols.

References

- ASTM (1999). Standard Guide for Terminology Relating to Forensic Psychophysiology. Committee E-52, Standard E-2035-99. American Society for Testing and Materials, Conshohocken, PA.

² Backster developed symptomatic questions to address outside issues that may interfere with the examinee's psychological set, self-directed onto the relevant or comparison questions.

³ Double-bind is also a technique of hypnosis, and of interrogation; however, research on double-bind is wider than both.

- Backster, C. (1960). Anti-Climax Dampening Effect. School Handout. Backster School of Lie Detection, New York, N. Y.
- Backster, C. (1962, May-June). Methods of strengthening our polygraph technique. Polygraph and Interrogation. Academy for Scientific Interrogation. New York, NY.
- Backster, C. (1963, October). Anticlimax Dampening Concept. *Military Police Journal*, Augusta, GA.
- Backster, C. (1964, February). Polygraph spot analysis versus non-localized analysis. Academy for Scientific Interrogation, *Law and Order*, 12(2). New York, NY.
- Barland, G. H. (2001, February 21). Personal communication.
- Bauer, B., Besner, D. (1997). Processing in the Stroop task: Mental set as a determinant of performance. *Canadian Journal of Experimental Psychology*, 51: 61-68.
- Beck, T. R., Berry, R. L. (1963, January). Orientation on lie detection examination: Glossary of lie detection terminology. USAMP, Fort Gordon, GA.
- Berry, R. L. (1965, May). Psychology of the Backster Zone Comparison Technique. USAMPS, Fort Gordon, GA.
- Eimer, M. (1996). ERP modulations indicate the selective processing of visual stimuli as a result of transient and sustained spatial attention. *Psychophysiology*, 33(1): 13-21.
- Eimer, M. (1996). Selection and inhibition in attention and motor activation. Abstract of paper presented at 36th annual meeting of the Society for Psychophysiological Research. *Psychophysiology*, 33(1S): S12.
- Festinger, Leon (1957). Theory of Cognitive Dissonance. Stanford University, Stanford, Calif.
- Fechner, Gustav. (1966). Translated by Helmut E. Adler. *Elements of Psychophysics*. Holt, Rinehart and Winston, Inc. New York.
- Freedman, R., Adler, L. E., Gerhardt, G. A., Waldo, M. C., Baker, N., Rose, G. M., Drebing, C., Nagamoto, H., Bickford-Wimer, P., and Franks, R. (1987). Neurobiological studies of sensory gating in schizophrenia. *Schizophrenia Bulletin*, 13: 669-678.
- Garcia-Larrea, L., Lukaszewica, A. C., and Mauguiere, F. (1995, November). Somatosensory responses during selective spatial attention: The N120-to-N140 transition. *Psychophysiology*, 32(6): 526-537.
- Haken, M. D. (Ed) (1998, February). Visual Attention: Understanding the mind's eye. Basic research in psychological science. *Observer*, American Psychological Society, Special Issue, AHI Report 6.
- Hill, W. F. (1970). *Psychology: Principles and Problems*. Philadelphia, PA: J. B. Lippincott. Co.
- Honts, C. R. (2000). A brief note on the misleading and the inaccurate: A rejoinder to Matte (2000) with critical comments on Matte and Reuss (1999). *Polygraph*, 29(4): 321-325.
- Kappas, A., and Smith, C. A. (1997). The psychophysiology of emotion: The role of stimulus relevance, motivational congruence, and coping potential. Abstract paper presented at the 37th annual meeting of the Society for Psychophysiological Research. *Psychophysiology*, 34(1S): S4.

- Karayannidis, F., Andrews, S., Ward, P. B., and Michie, P. T. (1995). ERP indices of auditory selective attention in aging and Parkinson's disease. *Psychophysiology*, 32(4): 335-350.
- Kenemans, J. L., Smulders, F. T. Y., and Kok, A. (1995). Selective processing of two-dimensional visual stimuli in young and old subject: Electrophysiological analysis. *Psychophysiology*, 32(2): 108-120.
- Krapohl, D. (2001, February 12). Personal communication.
- Kropotov, J. D., Etlinger, S. C., and Ponomarev, V. A. (1997). Human multiunit activity related to attention and preparatory set. *Psychophysiology*, 34(5): 495-500.
- LaBerge, L. D. (1990). Attention. *Psychological Science*, 1: 156-162.
- Lorist, M. M., Snel, J., Kok, A., and Mulder, G. (1996). Acute effects of caffeine on selective attention and visual search processes. *Psychophysiology*, 33(4): 354-361.
- Matte, J. A. (1996). *Forensic Psychophysiology Using The Polygraph*. Williamsville, NY: J. A. M. Publications.
- Morris, C. G. (1973). *Psychology: An Introduction*. Englewood Cliffs, NJ: Prentice-Hall.
- Ruch, F. L. (1948). *Psychology and Life*. Chicago, IL: Scott Foresman.
- Reber, A. S. (1995). *The Penguin Dictionary of Psychology*. Penguin Books, Ltd. London, England.
- Titchener, E. B. (1914). *Systematic psychology: prolegomena*. New York: Macmillan (last edition, 1929)
- Treisman, A. (1988). Features and objects: The fourteenth Bartlett Memorial Lecture. *Quarterly Journal of Experimental Psychology*, 40A: 202-237.
- Trejo, L. J., Ryan-Jones, D. L. and Kramer, A. R. (1995). Attentional modulation of the mismatch negativity elicited by frequency differences between binaurally presented tone bursts. *Psychophysiology*, 32(4): 319-328.
- U. S. Senate Hearings (1977). Project Mkultra, The CIA's program of research in behavioral modification. <http://www.parascope.com/ds/documentslibrary/documents/mkultrahearing/mkultraHearing04.htm>.
- Van Der Molen, M. W., Somsen, R. J. M., and Jennings, J. R. (1996). Does the heart know what the ears hear? A heart rate analysis of auditory selective attention. *Psychophysiology*, 33(5): 547-554.
- Ward, R., and Goodrich, S. (1996). Differences between objects and nonobjects in visual extinction. A competition for attention. *Psychological Science*, 7(3): 177-180.
- White, P. M., and Yee, C. M. (1997). Effects of attentional and stressor manipulations on the P50 gating response. *Psychophysiology*, 34(6): 703-711.
- Woldorff, M. G., Hillyard, S. A., Gallen, C. C., Hampson, S. R., and Bloom, F. E. (1998, May). Magnetoencephalographic recordings demonstrate attentional modulation of mismatch-related neural activity in human auditory cortex. *Psychophysiology*, 35(3): 283-292.