

Cognitive techniques and language: A return to behavioral origins

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Abstract

Background: the main purpose of this study is to offer an alternative explanatory account of the functioning of cognitive techniques that is based on the principles of associative learning and highlights their verbal nature. The traditional accounts are questioned and analyzed in the light of the situation of psychology in the 1970s. **Method:** conceptual analysis is employed to revise the concepts of language, cognition and behavior. Several operant- and Pavlovian-based approaches to these phenomena are presented, while particular emphasis is given to Mowrer's (1954) approach and Ryle (1949) and Wittgenstein's (1953) philosophical contributions to the field. **Conclusions:** several logical problems are found in regard to the theoretical foundations of cognitive techniques. A combination of both operant and Pavlovian paradigms based on the above-mentioned approaches is offered as an alternative explanatory account of cognitive techniques. This new approach could overcome the conceptual fragilities of the cognitive standpoint and its dependence upon constructs of dubious logical and scientific validity.

Keywords: Cognitive techniques, language, behavior, Pavlovian conditioning.

Resumen

Técnicas cognitivas y lenguaje: un regreso a los orígenes conductuales.

Antecedentes: el objetivo de este trabajo es proponer una alternativa explicativa al funcionamiento de las técnicas cognitivas basándonos en los procesos de aprendizaje asociativo y destacando su carácter verbal; se cuestionan las explicaciones tradicionales, que se analizan a la luz de la situación de la psicología en los años 70 del siglo pasado. **Método:** se emplea el análisis conceptual para revisar los conceptos de lenguaje, cognición y conducta y se presentan las propuestas desarrolladas para su estudio desde planteamientos operantes y pavlovianos, haciendo especial hincapié en las aportaciones de Mowrer (1954) y en los planteamientos filosóficos de Ryle (1949) y Wittgenstein (1953). **Conclusiones:** se detectan una serie de problemas lógicos en los fundamentos de las terapias cognitivas. La combinación de los paradigmas operante y pavloviano y su soporte filosófico en las propuestas señaladas suponen una superación de dichas flaquezas y permiten una explicación del funcionamiento de las técnicas cognitivas sin necesidad de recurrir a constructos de dudosa validez lógica y científica.

Palabras clave: técnicas cognitivas, lenguaje, conducta, condicionamiento pavloviano.

The objective of this paper is to present an analysis of cognitive techniques in the light of associative learning processes. We question their traditional conceptualization in terms of variables and processes qualitatively different from behavior, and present them as verbal techniques. From our perspective, not only is their structure essentially verbal—that is, they are implemented through speech—but what they deal with is verbal as well: the clients' linguistic thoughts, internalized forms of manifest verbal behavior that may have a fundamental role in the way we interact with the environment. Our proposition draws from a necessary revision of the concepts of thought, language and behavior, and is based on Mowrer's (1954) explanation of meaning transfers. His contributions within the framework of Pavlovian conditioning could be, in our opinion, the perfect supplement to the operant explanations retrieved by contextual therapies (RFT; Hayes, Barnes-Holmes, & Roche, 2001). As a result of this analysis, an

explanation of cognitive techniques, their functioning and their indubitable efficacy in therapeutic change can be formulated without resorting to explanations and concepts that are a burden for the formal development of psychology as a science.

The emergence of cognitive techniques in Behavior Modification (BM) led to so-called Cognitive-Behavior Modification (CBM) and was closely related to the situation of psychology in the 1970s. The general lack of knowledge about neo-behaviorism (Skinner, 1957, 1969; Kantor, 1921, 1975) and the frequent confusion between methodological and radical behaviorism facilitated the rise of cognitivism as an answer to the alleged reductionism of behaviorism. Consequently, behavior was replaced by the mind as the primary object of study of psychology. Researchers started to focus more on the inferred central processes that supposedly explained behavior; a sort of "mind-centrism" that resembles the current "brain-centrism" (Pérez, 2012), where Neurosciences and Psychobiology displace the research on behavior itself.

Research on information processing and the powerful development of computational sciences and artificial intelligence deeply affected psychology. Its main goal became to adequately characterize the functioning of the processes responsible for acquiring, manipulating, storing, and retrieving information for decision-making (Dennett, 1978). Moreover, some research

findings (experimental confirmation of the role of cognitive variables in behavior performance (Ader & Tatum, 1961; Baron & Kaufman, 1966) or the results that showed that associations between words were due more to their meaning than to their phonetic similarity) seemed to imply that associative learning was insufficient to explain behavior.

This is when the so-called “cognitive leap” takes place (Mahoney, 1974): techniques developed by clinicians from a psychodynamic tradition, like Ellis’ rational-emotional therapy and Beck’s cognitive therapy (Beck, 1967; Beck, Rush, Shaw, & Emery, 1979; Ellis, 1962; Ellis & Grieger, 1977) are included in BM, thus leading to Cognitive Behavior Modification (CBM). CBM’s main characteristic is that mediational variables are taken as the causes of manifest behavior. Thus, in order to modify a client’s problematic behavior, the intervention must focus on a series of cognitive variables and processes whose change ultimately determines any behavioral change. That this kind of explanation was used in the 1970’s, given the aforementioned situation of psychology in general and BM in particular, is understandable. But in light of the approaches that arose in the 1990’s, firmly supported by the experimental advances in the field of verbal behavior, it is questionable whether explanations based on these mediational variables can be upheld. It is also worth asking whether another kind of explanation could be achieved, an experimentally and logically well-founded explanation where circular concepts that needlessly clutter psychological intervention wouldn’t take part. Maybe it was the ignorance about the experimental and theoretical foundations of associative processes and the behavioral approach to language what led to the popularization of ad hoc constructs created by CBM to explain what isn’t easily explained. As Pérez (1996) said, following Skinner, the verbal field offers the solution to the only problem subjectivism might pose to a science of behavior.

Method

In order to introduce our thesis, we first call the foundations of cognitive techniques and their traditional conceptualization into question. As an example, we analyze Beck’s proposal (Beck et al., 1979) and its tripartite organization of the mind: cognitive facts at the surface, cognitive processes at a deeper level and, lastly, cognitive schemata, which are inaccessible to consciousness and ultimately determine human behavior. Cognitive schemata can be altered by means of linguistic tools, mainly the Socratic method. This technique employs the maieutic method in order to help the clients question and replace their maladaptive thoughts with more adaptive ones. This cognitive change progressively fosters new behavioral strategies, which, in turn, are the only “evidence” that the cognitive schemata have changed.

Besides its tautological character, this rationale entails the existence of a “second substance” with causal powers on behavior: the mental, separated from the material (environmental and organic-structural). This, in turn, entails a qualitative distinction between physical and mental processes that is not only unjustified and opposed to a solid philosophical foundation for the scientific analysis of psychological problems; it is also unnecessary. If our only evidence for cognitive change is precisely the observed behavioral change, where is the explanatory virtue of cognitive schemata?

From our perspective, a thorough review of the concepts of cognition, language and behavior leads us to the conclusion that

many of the philosophical problems encountered by psychology are just pseudo-problems caused by a loose employment of mental terminology and an inappropriate conception of the mental.

Our proposal is grounded in some contributions of the contemporary philosophy of mind and language, specifically on Ryle (1949) and Wittgenstein’s (1953) anti-descriptivist and anti-factualist approaches. From their perspective, our language is not only intended to describe the world, but has a wide array of functions (hence the “anti-descriptivism”). Accordingly, many of the mental concepts that we employ in daily speech contexts do not stand for factual entities with causal powers on behavior (hence the “anti-factualism”). In Ryle’s (1949) terms, the reification of the mental (beliefs, desires, schemata, etc.) constitutes a category mistake, rooted in the “Descartes’ myth” (*res extensa* [bodily, physical processes] vs. *res cogitans* [mental processes]). Thus, mental concepts are just useful terms that we employ to justify behavior (that is, to make our actions intelligible) (Pinedo, 2014; Ryle, 1949; Wittgenstein, 1953). In a similar vein, Sellars (1956) proposed that our mentalist explanations of behavior do not pertain to the realm of nomological explanations (those that state the *causes* of behavior), but to the realm of normative explanations (those that we commonly employ when we give *reasons* for our behavior). Although both types of explanation intend to provide an answer to the whys and wherefores of behavior, they do so in different ways: the former are scientific explanations, while the latter are normative justifications.

However, from a radical behaviorist standpoint there is at least one mental concept that holds a relevant role in our nomological explanations of behavior: the concept of thought (covert events occurring “under the skin”) (Skinner, 1974). Given the scope of the paper, we will only focus on linguistic thoughts (covert verbal behavior). According to the radical behaviorist standpoint, covert verbal behavior has its roots in manifest verbal behavior. Likewise, Vygotsky (1962) observed that adults first verbally guide the children’s behavior; consequently, the kids learn to emit self-guiding verbalizations to monitor their own behavior; finally, their verbal community teaches them to “keep those verbalizations for themselves”. We could say that adults establish fairly systematic operant programs that end up with the internalization of social speech (Alcaraz, 1990; Mowrer, 1954).

Verbal control of behavior is what Skinner (1969) called “rule-governed behavior”. A rule is a verbal description of a behavioral contingency (either manifest or covert) that can affect our behavior in a similar way to the described contingencies themselves (Alcaraz, 1990; Mowrer, 1954; Stemmer, 1973; Tonneau, 2004; Tonneau & González, 2004). The relationship between verbalizations and the events described by them constitutes the symbolic function of language (Tonneau, 2001). This function is the key to understand how rules connect us with temporally and spatially distant events; in Mowrer’s terms, “it enables us to go from the concrete to the abstract, from the here-and-now to the “not here, not now” (Mowrer, 1954: 662). From our perspective, the symbolic function is to be understood in terms of the Pavlovian processes that operate in language.

Mowrer went beyond the Pavlovian conception of language as a “second signal system” and conceived the symbolic relations among events in terms of “sentences”. A “sentence”, in Mowrer’s (1954: 665) terms, “is a conditioning device [whose] chief effect is to produce new associations, new learning”. He distinguished four types: thing-thing, thing-sign, sign-thing and sign-sign. These four

types of sentences establish the Pavlovian processes that effect “meaning transfers” among both linguistic and non-linguistic events.

The current “islamophobia” constitutes a good example of a (deplorable) meaning transfer. According to Mowrer (1954), the “meaning” of an event (either a word or a thing) is just the set of sensory-motor reactions elicited by that event. Thus, the association between the words “Muslim” and “terrorist” cannot be explained in terms of a simple second-order conditioning process, for that would imply to treat both words as synonyms (something unthinkable even for the most extreme case of islamophobia). Consequently, he proposes the concept of “mediating response”. To understand this concept, first we need to examine how the words “Muslim” and “terrorist” acquired their meanings in the first place (figure 1 shows the conditioning sequences). The perceptual contact with a Muslim person (unconditioned stimulus, US) elicits a set of unconditioned responses (UR) that we could call R_M . After n thing-sign trials, the word “Muslim” becomes a conditioned stimulus (CS) that elicits a conditioned response (CR): r_M , a “detachable” component of R_M (Mowrer, 1954: 667).

Let’s assume that a similar process occurs with the word “terrorist”. When a person hears the sign-sign sentence “all Muslims are terrorists” (second-order conditioning), r_M is associated with the meaning of “terrorist” (r_T). However, for the Muslim person to be associated with the word “terrorist” the mediating response is needed: when R_M is elicited by the visual contact with a Muslim person, its component r_M is also elicited; this mediating response, in turn, elicits r_T [Muslim- R_M (r_M-r_T)]. The mediating response allows us to explain how the alteration of the meaning of “Muslim” produces an alteration in the set of responses elicited by a flesh and blood Muslim person.

Once the [Muslim- R_M (r_M-r_T)] complex has been established, it can act as an S^d for escape or avoidance operants (e.g., keeping a distance from Muslim people), thus hindering contact with excellent Muslims (the over-whelming majority) and the subsequent

counterconditioning. Further associations between “Muslim” and “terrorist” through self-verbalizations and the constant news on ISIS barbarity explain (although don’t justify) why “Muslim” is becoming a highly aversive term for many people.

Tonneau’s work (2001, 2004; Tonneau & González, 2004) provides an updated Pavlovian approach to language: relations among linguistic and non-linguistic events constitute “functional equivalence relations”, which are established through “function transfer” processes. What characterizes the symbolic processes that operate in language is that function transfer can be achieved without a direct pairing between two stimuli. If a signal-stimulus X is paired with a target-stimulus A, a signal-stimulus Y is paired with an US B and, finally, X and Y are paired, function transfer from B to A is achieved even though these stimuli were never paired directly. Furthermore, the establishment of correlations among stimuli would suffice to produce function transfer.

Among the most important contributions of Tonneau’s analyses, the exposition of the distinctive explanatory roles of Pavlovian and operant conditioning in the study of symbolic processes must be highlighted. According to Tonneau (2001: 25), operant processes might play a fundamental role in the solution to the so-called “extinction problem”: due to the absence of subsequent systematic pairings between sign-stimuli (“apple”) and thing-stimuli (an apple itself), the capacity of the former to elicit responses akin to those elicited by the latter should decrease over time. However, this is not the case; we don’t need to pair the word “apple” with real apples every so often to continue to be competent users of such word. According to Tonneau (2011: 25) operant reinforcement might affect “the probability that active stimulus correlations keep transferring functions from one stimulus to another”.

However, if we follow the Wittgensteinian approach to language, operant processes might not only take part in the maintenance of functional equivalence relations, but also in their genesis. Wittgenstein (1953) points out that it is not possible to learn the association between a linguistic sign and its referent

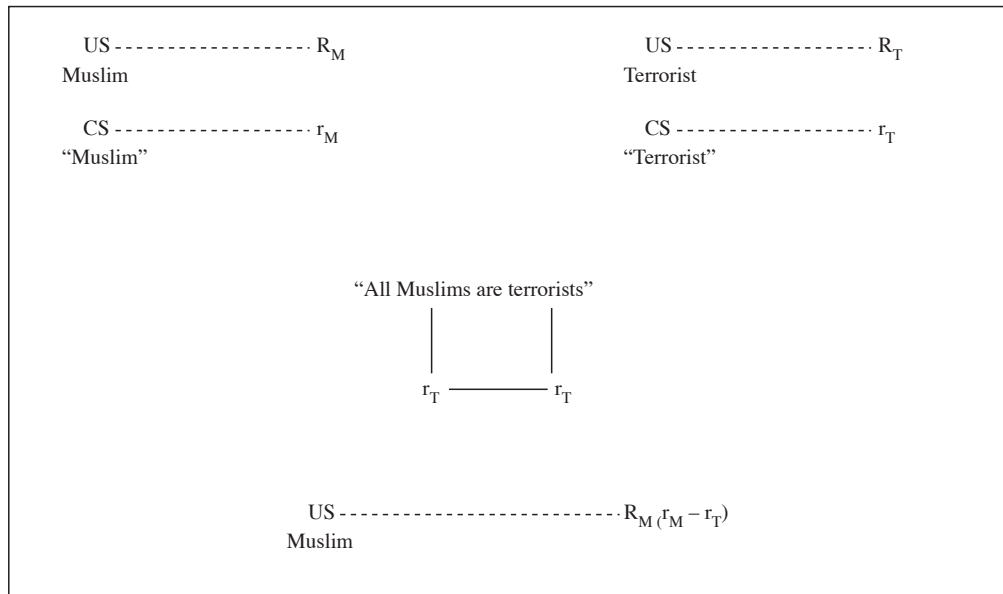


Figure 1. Following Mowrer’s nomenclature, capital letters with a subscript refer to responses that are elicited by thing-stimuli, while lowercase letters with a subscript refer to a subset of them that is elicited by sign-stimuli [mediational response]; signs are represented by words in quotes and things by words alone

through an ostensive definition (that is, pointing at the referent while naming it); if so, it would be impossible to discriminate the correct sign-referent association (“apple”-apple vs. “apple”-red or “apple”-round shape). Ostensive definitions offer the occasion for the establishment of sign-referent associations, but they don’t provide the *rules of use* of such terms. According to Wittgenstein (1953), learning new meanings implies learning how to play new “language-games”, that is, how words are to be employed. From a behaviorist perspective, we could thus say that it isn’t the mere pairing of signs and referents, but the progressive shaping of verbal behavior by a sociolinguistic community that enables a person to discriminate between correct and incorrect ways to employ a term. In Tonneau’s terms, this regular verbal shaping would establish stable correlations between sign-stimuli and thing-stimuli, which would in turn give rise to “socially appropriate” functional equivalence relations.

Consequently, understanding how operant and Pavlovian processes contribute together to the genesis, maintenance and change of symbolic processes is a must for a full-fledged behavioral characterization of language. In addition, understanding how the learning of verbal operants in the “here-and-now” can affect our behavior in the “not here, not now” is essential to understand clinical change, which is usually effected throughout a fundamentally verbal interaction. Finally, the characterization of (linguistic) thoughts in terms of covert verbal behavior with a causal role in the maintenance and change of other behaviors is also key to achieve a full comprehension of how language shapes our interaction with the environment.

Discussion

The question to be addressed now is whether it is possible to maintain our conceptualization of cognitive techniques as verbal procedures that can be explained in terms of associative processes.

In view of the above, when cognitive therapists observe the clients’ manifest behavior and conclude that they are just witnessing the manifestation of an inner causal process, they are reifying “cognitive schemata” and confusing a normative with a nomological explanation. From an anti-factualist perspective, “cognitive schema” does not allude to a concrete entity. Rather, it is a term that cognitive therapists use to rationally characterize the patterns of dysfunctional behavior shown by their clients. The reason why they cannot access their cognitive schemata through self-observation is not that these are consciously inaccessible, but that they are just linguistic tools to normatively explain behavior. However, clients do observe their “automatic thoughts” and how these control their behavior in certain circumstances. We propose to regard them as behaviors –thus, factual entities– that can be functionally analyzed and that needn’t be at the root of the psychological problem, but rather constitute another part of it. It could seem that we are oversimplifying human complexity when we assert that thought is one more element of the possible functional associations between S-stimuli and R-responses. We wholeheartedly disagree with that impression: in the same way that musical symphonies can be composed using only seven notes, S-R-S functional relations may generate extremely complex behaviors.

Consequently, cognitive techniques can be conceived as verbal techniques, since they operate through speech and on linguistic

thought (manifest verbal behavior that was socially learnt and then internalized). Even more importantly, this explains how verbal interaction in therapy can modify the client’s extra-clinical behavior. Accordingly, tautological mind constructs whose logical type entails a category error are no longer needed. The very name of “cognitive technique” would thus be incorrect, and any explanation of their functioning could be extended to any therapeutic interaction (Ruiz-Sancho, Froján-Parga, & Galván-Domínguez, 2015).

Contextual therapies, which are revolutionary in their return to radical behaviorism, proposed an operant-based explanation of private events that focused on verbal behavior (Catania, 1968; Luciano, 1993; Unturbe, 2004). *Verbal Behavior* (Skinner, 1957) was the starting point for the development of Functional Analytic Psychotherapy (FAP, Kohlenberg & Tsai, 1991) and Acceptance and Commitment Therapy (ACT, Hayes & Wilson, 1994; Hayes et al., 1999); both proposed that therapy involved a great deal of talking, but therapists did not handle speech as verbal behavior. They retrieved the research on equivalence relations (Sidman, 1971), whose experimental results allowed for a behavioral understanding of various cognitive constructs (Dougher, 1998). Behavior was defined as a three-term contingency whose combination results in a multiple causality that might generate extremely complex behaviors. The concept of rule and the distinction between “rule-governed” and “contingency-shaped” behaviors (Catania, Shimoff, & Matthews, 1989; Skinner, 1957, 1969) were also recovered.

Our proposal largely agrees with contextual therapies, but it also retrieves Pavlovian conditioning as a tool for language analysis. We consider that Mowrer, Tonneau and Wittgenstein’s approaches complement each other and strengthen our proposal of combining classical and operant processes to study language and speech. This allows us to dispense with the weakest foundations of third wave therapies: the Relational Frame Theory (RFT, Hayes et al., 2001), criticized by various authors (Tonneau, 2001, 2004). From our perspective, the RFT is a triple mortal leap of faith from its base on matching-to-sample research (Pérez-Fernández, 2015; Sidman, 1971; Sidman & Tailby, 1982).

We propose that the study of the language-cognition-behavior triad in terms of associative learning processes offers a plausible alternative explanation for psychological therapy in general and cognitive techniques in particular (Froján-Parga, Montaña-Fidalgo, Calero Elvira, & Ruiz-Sancho, 2011; Montaña, Calero, & Froján, 2006). From our perspective, not all psychological problems are caused by an inadequate cognitive functioning (the cornerstone of cognitive therapies); on the contrary, the function of linguistic thoughts in each specific problem should be established. Occasionally, a functional analysis might show that there’s a defective verbal control that causes problematic behavior. In such cases, modifying that control by means of cognitive-verbal techniques like the Socratic method could be convenient. This technique can be conceived as a combination of verbal shaping and chaining processes: verbalizations that approach the desirable pro-therapeutic utterances are discriminated and reinforced, while those that move away from the target utterance are punished or extinguished (Calero-Elvira, Froján-Parga, Ruiz-Sancho, & Alpañés-Freitag, 2013; Froján-Parga & Calero-Elvira, 2011).

However, the operant approach cannot single-handedly explain how these verbalizations modify the client’s behavior in extra-clinical settings where neither the verbalization nor the described

operant have been reinforced. A certain analogy to the emergence of derived responses in matching-to-sample procedures can be drawn here (see Pérez-Fernández, 2015; Tonneau, 2001). Here, RFT introduces the concept of “relational behavior”: the behavior of establishing associations, ultimately responsible for “function transformation” (the change of a stimulus function due to its pairing with other stimuli). RFT questions this to be an exclusively operant functional transfer phenomenon and develops the concept of “relational frame” to explain it (Hayes et al., 2001).

The relational frame is nonetheless a controversial concept (Tonneau, 2001, 2002, 2004) that fails to account for the deferred control that the therapist’s intervention has over the client’s behavior. Instead, Mowrer’s mediating response can explain how the intervention in clinical contexts can directly affect behaviors in extra-clinical settings. The therapist’s appetitive or aversive utterances that follow some of the client’s verbalizations not only reinforce/punish the client’s verbal behavior, but also associate the client’s emotional response as the addressee of those reinforcing/punishing utterances with the response elicited by the client’s own verbalizations. In other words: the Mowrerian meanings of the client and the therapist’s verbalizations are associated. Through subsequent sign-sign pairings, the thing-stimulus referred to by the client’s utterance may start to elicit responses similar to those elicited by the sign-stimulus (that is, a meaning transfer is achieved). The therapist’s job would thus be to expose the client to utterances that elicit responses in line with the therapeutic objectives. Since such utterances are functionally equivalent to their referents, we can explain the behavioral change towards a thing-stimulus as a result of the meaning transfer between two words in sign-sign sentences (that is, without directly pairing the thing-stimulus with the emotional response). The Pavlovian association between the responses elicited by the client’s utterances and those elicited by

the therapist’s might not be extinguished because the client’s new behaviors that result from this association are useful in Tonneau’s (2001) terms: they allow the client to access reinforcing situations. The role of operant conditioning would thus be to maintain the functional equivalence relations established through Pavlovian processes. Consequently, both kinds of conditioning act conjointly during the therapeutic intervention.

We believe that this explanation is undoubtedly more parsimonious than the tautological cognitive models that account for human behavior in terms of causal entities of a dubious ontological character. Withdrawing those entities from our causal analyses and embracing an explanation based on the combination of classical and operant conditioning can only enhance the theoretical solidity and experimental possibilities of research on clinical change. The Pavlovian analysis of language bridges the gap between clinical and extra-clinical settings. Specifically, the concept of mediating response explains how behavioral change is achieved without the need to directly train behavior in relation to the thing-stimuli. This is immensely interesting given the difficulty –or rather impossibility– of a direct and not verbally-mediated intervention in the client’s everyday settings. In sum, this approach opens many promising ways for a solid development of psychological treatments.

We don’t consider this return to the behavioral origins of cognitive techniques to constitute a retrogression, but rather a leap forward that helps us bypass the theoretical dead end in which contextualist schools are stuck due to their almost exclusive emphasis on operant conditioning. We also consider it to be more philosophically and scientifically sound than any alternative proposed by CBM, whose dualistic and tautological model has led to the stagnation (and probably retrogression) of the experimental development of psychological intervention.

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