A Cybernetic Model for Misperceptions and Aggressiveness in Students

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Abstract

In this paper we propose a cybernetic conceptual model to explain misperceptions and aggressive behavior in students based on a cybernetic cognitivist approach. In addition, preconditions for educational intervention programs to develop social skills of tolerance, respect, managing emotions, based on awareness and reflection are proposed.

Keywords: aggressiveness, misperceptions, perceptual distortion

Introduction

Several studies about aggressiveness in secondary schools show a significant percentage of students explaining their aggressive behavior as a response to being incited by the victim through a physical or verbal provocation. Sometimes this may be the case, but most times there is a misperception and misinterpretation of social cues, taken as threats, inciting the aggressor to defend herself.

In this paper we propose a cybernetic conceptual model to explain this kind of aggressive behavior in students based on a cybernetic cognitivist approach and the theory of Erik Erickson [1]. He considers the child’s first stage of life as the one where the concept of personal environment is built, providing the basis of the expectations about the world. In favorable cases the world will be conceptualized as a nice and good place to live. Otherwise, the world will be taken as a source of different threats to the self and distrust can lead to confusion in relationships with others at a later age. However, according to Erickson, crises are not necessarily damaging, but a source of potential transformations of the individual and the better are resolved, the healthier development of the individual.

We will focus the role of memory and perception in the construction of the concept of a threatening environment and the tendency to see the behaviors of others in the form of provocation. Then we will analyze the homeostatic mechanisms that build this misperception leading to aggressive behavior. Finally we will suggest the preconditions for the intervention strategies for the development of the necessary elements to change the aggressor’s perceptual model that leads to wrong behavior.

Antecedents

Social psychological schools such as behaviorism, cognitive neuroscience, constructionism and social learning theory have studied the problem of bias in the interpretation of social cues.

Kassinove & Chip [2] highlight the tendency in aggressive children and adolescents to misinterpret ambiguous or benign behaviors and intentions of peers as hostile. The authors note that this trend is well documented by Dodge & Crick [3].
Beck [4] states that aggression resulting from distortions and cognitive deficits of perceptions causes distorted thinking styles and lead the subjects to become "prisoners of hate". For example, when a teenager blames another unjustifiably for personal damage, that attributed guilt is expressed affectively as resentment, hatred or revenge. There is a misperception of threat from pretended enemies and a state of mistrust.

Velazquez & Escobedo [5] identified in the natural interactions between students, the following aggressive behaviors: a) to perceive the behavior of others as a provocation and aggression and acting to defend themselves, b) inability to perceive himself as aggressive in the situation, c) persistent anger and lack of self-control to manage aggressiveness on a daily incident with a partner. This is due to the prevalence in the adolescent brain of the development of limbic systems, (like nucleus accumbens and amygdala) implicated in emotional reactivity, compared to the cortical prefrontal regions associated with cognitive control [6].

In fact, the Secretary of Education of Mexico City and the Intercontinental University published the results of an exploratory study [7] about abuse and intimidation among school partners, carried out to 3,500 students belonging to 29 primary and secondary schools of the Federal District. In this study they asked to the students: Why do you bother your partners? The students answered: "because they provoked me" in 57% of the cases from primary level students and 45% of the cases from high school students.

**Perceptual Distortion**

We will take a cognitivist approach based on Cybernetics and Cognitive Neuroscience. Perception is the process of attaining awareness or understanding of the environment through the analysis, organization and interpretation of a set of sensory stimulus proceeding from a distal object [8]. The sensory organs transform the sensory stimulus into a neural activity pattern called the proximal stimulus through a transduction process. Upon the proximal stimulus the brain construct a percept as recognition of the distal object associated with the specific set of sensations.

All sensory receptors that allow contact with the environment are important and even vital, allowing the subject alert to situations that may jeopardize their own survival, such as smell or taste of spoiled food.

Homeostatic mechanisms evolved in vertebrates linking percepts with the nerve centers of the hypothalamus and limbic systems (like nucleus accumbens and amygdala), implicated in basic emotions like fear, anger, distrust and aggression, cataloged as the "basic instincts of protection and conservation of individual against the unknown" [6]. These neural structures are stimulated in parallel with the percepts related to the satisfaction of the instinctual needs of defense and survival.

Thus, the percept is processed and interpreted in the brain in accordance with conceptual schemata developed by the individual to get a meaning for him [9]. Thereafter it becomes information that can be used consciously or unconsciously to make decisions and carry out appropriate response actions [19]. In order to do this, the subject must have constructed, based on experience, proper conceptual schemata of the portions of reality referred to such information. In these schemata she integrates the sensations and data obtained from the specific experiences she had when she interacted with those portions of reality throughout life [9].

According to these percepts the individual includes the emotional references associated to both the conceptual schemata themselves, and the particular experiences perceived. These emotional references may be negative as rejection, anger, aggression, hatred or fear or positive as pleasure, joy, love, etc. Thus these cognitive processes depend from previous experience and memory.

For example, if I see my friend Chava coming to me and hear his greeting, my visual and auditory sensations are interpreted according to my conceptual schemata of "friend" and
"Chava" resulting in the recognition and perception of the subject that comes and greets me as "my friend Chava". This perception provokes to me a certainty feeling and a greeting response, associated with positive emotions such as joy, pleasure and excitement. The conceptual schema of "friend" contains all information and affective meanings about friends gained in the course of my existence. Thus, in the conceptual schema "friend" are included the total direct and indirect experiences I ever had with my friends as well as the total good and bad qualities of such friends, and the affective impressions that they caused in me. Hence, each conceptual schema according to Dawkins is a comprehensive information unit, a meme [10]: something like a complete treatise on a subject, developed by the cognitive subject.

Sowa considers a conceptual schema as a system that links and relates many neural circuits in the sensitive, emotional and motor brain areas of a cognitive subject. This neural network is activated only under the action of a specific perception, a specific memory or a symbol associated with the object perceived [9].

According to Sowa [9], this perceptual process is critical to interpreting the world by a subject, because it determines how to capture and respond to the environment [18]. Indeed, the perception depends on cognitive schemata given by previous experience, memory and information processing. These cognitive schemas are the keys to the perceptual distortion, where there is a perceptive exploration in the wrong direction that guides the process of object recognition and information extraction. In fact, there is a perceptual distortion when the perceptual process is inadequate because the interpretation of sensations does not match reality. This can lead to stress and aversive emotions such as distrust, feelings of threat, anger, hatred, fear and revenge, generating responses of rejection and aggression.

McKeough, Yates and Marin [11] report that perceptual distortion in children and adolescents are due to negative experiences in social development such as abuse. In the same way Gibbins & Craig [12] confirm that children who are violent for these reasons, tend to see their surroundings or the intentions of others as aggressive, thereby generating a large number of hostile responses.

Following Erik Erickson [11] in the first year of life of the child is when the anxiety or fear of strangers, the instinct of conservation and the distrust before the unknown appear. It is through the socialization process where the affection and the stimuli she receives in their interactions with adults will be critical to her development. Otherwise, distrust can lead to identity confusion in adolescence. If an individual has experienced in early childhood physical and emotional insecurity, and during growth has had negative experiences such as abuse, she tends to see her surroundings with distrust, defined as "a basic protection and conservation instinct of the individual against the unknown" and the intentions of others as aggressive. This will result in a defense behavior that would seek to end this experience.

From the set of conceptual schemata acquired by experience, training and abstraction and their associations, the child builds subjective and individual rules to interpret the outside world. With this set of rules the individual compares new sensations and perceptions: if they match a conceptual schema, she can interpret what perceives and gets certainty. But if she doesn't find an appropriate conceptual schema for matching, she will not know how to manage these new sensations, and experiences doubt.

Therefore certainty is according to Young [13] the favorable outcome of the attempt to match a new experience and the existing conceptual schemata. Certainty brings: self-confidence or trust in himself and self-assurance. Therefore, certainty is the basis of a direct firm, confident and without hesitation behavior. Doubt, however, is the unfavorable result of the attempted match between a new experience and conceptual existing schemata. Doubt brings: mistrust, fear and insecurity. This negative affective influence, stimulating the inhibitory centers of the cortex and caudate nucleus, is the basis of indirect, tentative, reserved and hesitant behavior [13].
Self-confidence and self-esteem

Hevia in his book Pedagogía de la Confianza [14] states that the lack of trust increases fear considering the actions of people, animals, things, and even himself as threatening. By contrast, confidence is the great solvent of fear.

Castilla del Pino [15] states that there are feelings such as mistrust, suspicion and reserve, which come from an intolerance of uncertainty but also a need for trust. This dilemma arises from the intimate nature of emotional experience. Marandone [16] defines trust as a consensual vulnerability, which involves the notion of uncertainty and risk taking.

We believe that this existential need to trust shows positive elements for self-organization and homeostasis, because according to Castilla del Pino [15] it may have the following consequences: 1) requires the listener to accept uncertainty about other's feelings and to base interpersonal relationships on belief in the authenticity; 2) sincerity must be alleged, so there is a permanent far from equilibrium interaction and this leads to the importance of talking about feelings; 3) to recognize that the emotional complexity of life has increased the repertoire of feelings and in order to communicate, there is a need to reconcile feelings of dislike or hate, with positive feelings [15].

As a condition for trust to develop, it is necessary to reduce uncertainty and it depends on the sincerity or good intentions in the interaction with the peers, reinforced by a self-generating positive feedback loop. In this sense Marandone [16] refers to the feedback effect of trust, stating that "trust is a resource that increases with use, instead of diminishing, is a self-generating resource and progressively cumulative, as the levels of relational strength grow".

Self-esteem is understood as self-acceptance, self-preservation as well as self-concept and autobiographical project. According to Polaino-Lorente [17] self-esteem is the belief about one's value, which can lead to some relevant feelings about oneself, others and the world. Self-concept is defined as the set of cognitions and attitudes that each person has of her skills, abilities and limits. Without knowledge of self, her abilities and weaknesses, the individual cannot get the acceptance of what she is.

Conclusions

In this paper we presented a cybernetic cognitive conceptual model to explain misperceptions and aggressive behavior in students. We found that basic trust development through self-esteem and the value that the agent attributes to herself from the knowledge of her abilities, skills and limits will positively influence cognitive distortions related with the decrease of her misperceptions and aggressiveness.

Therefore self-esteem, basic trust development and self-regulation of distorted perceptions must be developed through awareness and reflection. This development should be a pre-condition for educational intervention programs for the young people to develop social skills, as the necessary elements to change the aggressiveness that leads to antisocial behavior.

References

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