Neuropsychodynamic of anxiety

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Abstract

Anxiety theory is very important in Freudian psychoanalysis, particulary the concept of signal anxiety which is central to unconscious conflict. According to the relational paradigm, anxiety is an interpersonal and affect regulation problem. Through affective neuroscience, Sullivan's interpersonal theory and Fonagy's mentalization theory, it is possible to develop a relational theory of anxiety. The amygdala plays an important role in implicit learning of relational representations characterized by anxiety, which inhibit affective regulation. Finally, some limits relating to the integration of psychoanalysis and neuroscientific research are presented.

Key words: *Anxiety, affect regulation, relational psychoanalysis, neuroscience*

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Introduction

According to psychoanalytic paradigm, in the clinical setting, enormous importance has always been attributed to the ego's ability to cope with a particular type of affect: anxiety. Sigmund Freud (1915, 1933) expounded two different theories on the origin of anxiety.
Before expounding the two Freudian theories on anxiety, it is appropriate, for the thesis that I present in this article, to clarify the distinction between anxiety and fear. According to Laplanche and Pontalis (1967) in classical psychoanalytic theory fear is linked to a specific external object, while anxiety is an existential state that does not appear to be linked to a specific object, it's a feeling, called also anguish, that in the Freudian economic model comes from the lack of discharge of internal impulses. But as we will see in the relational-interpersonal model anxiety comes from the outside, that is from affect regulation difficulties inside the mother-child relationship. With the rejection of the drive theory promoted by relational theory (Mitchell, 1988), the original distinction between fear and anxiety seems to have been nullified. The theory that anxiety develops from real fears born within the mother-child relationship has already been discussed by Winnicott (1956), who has made a great contribution to the insights described in this article.

Freudian theory

According to the first Freudian theory, anxiety is the result of the massive use of repression. For Freud, the affection joined to the representation turns into anxiety, in particular the process of transformation is the most important part of repression. The unconscious affect would thus be saved in the form of anxiety, specificaly a part of libido is transformed into anxiety. For example, according to Freud, in the phobia the impulse was transformed into anxiety and shifted to an external danger.
While in the second Freudian theory, anxiety becomes a signal that announces a situation of danger for the ego, which defends itself through defense mechanisms. For Freud it is no longer the repression that generates the anxiety, which would have existed even before the implementation of the defensive mechanism, but is the anxiety that generates the repression. Anxiety is linked to internal drive, in fact the drive satisfaction would be associated by the child with an external danger. For example, in the anxiety of castration, the sexual desire directed towards the mother is threatened by the castration of the child's penis. The drive investment that generates anxiety must be repressed, revoked and neutralized by the ego.
According to Morris Eagle (1993), in the second theory of anxiety sexual and aggressive desires are naturally and intrinsically enemies of the Self and therefore represent threats to the very survival of the person. From this perspective, a weak or immature ego would be faced with an excess of excitations of internal or external origin, which cannot be dealt with. The danger felt by the ego, at the origin of the sense of anxiety, is linked to the failure to satisfy the growing tension generated by desires. The anxiety would be linked to a fear of indomitable instinctual forces. In this model, the excessive drive can damage the ego. At the basis of all this there would be a primary antagonism between the id and the ego, which goes beyond the relational context in which the subject is inserted. Eagle states that the model proposed by Freud would be characterized by a strong contradiction linked to our biological nature, which is expressed through the fact that man born naturally with drives and an ego to which these drives are intrinsically enemies, as if the individual was "allergic" by nature to drives, which have always been entrusted to man through nature. Moreover, for the author, it seems that this model is not based on clinical evidence, but on a Freudian based idea that excessive arousal constitutes the prototypical danger situation for the ego, and that the primary source of this excessive arousal is the tension coming from instinctual needs which are not discharged.

Eagle writes: "*The idea that instinctual impulses, particularly those of great intensity, are inherently dangerous to the ego stems from an a priori model of tension reduction in human behavior as well as a concept of the tranquil nervous system in its natural state and ideal, and disturbed to varying degrees by excitement* "(Eagle, 1993, p.122).
On the other hand, the conceptualization of anxiety in the works of Harry Stack Sullivan, who contributed to the birth of relational thinking in psychoanalysis, is different.

Sullivan's theory of Anxiety

In the model proposed by Sullivan (1953), greater emphasis is attribuited to the interpersonal relationship between mother and child in the genesis of the sense of anxiety (Greenberg and Mitchell, 1983). In order to satisfy the child's innate biological and emotional needs another person must be present, conventionally the mother, who, through an empathic process, regulated the affect arousal of children, experiencing the condition of tension created in the child by unmet needs as her own. All this is defined by Sullivan with the term "*tender behavior*": the first mother-child relationships generate a need for tenderness that is fundamental in the development of the child's psyche, but not only that, these relationships allow optimal development from a neurobiological point of view (Schore 2003). For Sullivan, anxiety isn't the result of a libidinal excess, but the child's perception of the anxiety that his own tension has transmitted to the mother. The anxiety is "*caught*", captured by the mother, it is the relationship with her that generates tension and anxiety.
The child thus begins to divide his relational experiences with the caregiver based on the degree of anxiety they generate. Thus there are experiences characterized by an absence of anxiety, the "good mother", and experiences characterized by a strong anxiety, the "bad mother". The child will build his own self based on the validating responses of the environment.
Relational experiences without anxiety give rise to what the author calls "good me", while behaviors that generate anxiety first in the caregiver and then reflected in the child are structured in the "bad me". In addition, according to Sullivan, there is a third condition: in cases where a behavior produces too strong anxiety in the caregiver (and then in the child) it is excluded from consciousness, "dissociated", in what is defined by the author as "not me" (Greenberg and Mitchell, 1983).
In Sullivan's model personality is structured through "security operations" implemented to avoid the anxiety who is generated by the interpersonal context. The bad me and the not-me represent the parts of the self that generate the sense of anxiety in person.
As noted by Fonagy (2003), the evolutionary model proposed by Sullivan in the constitution of the self and anxiety is incredibly in line with the theory of emotional development presented by Gergely (1996), and on which the evolutionary theory of mentalization is based. The child has no symbolic capacity from birth to represent his own internal states, his arousal state acquires meaning thanks to the mirroring maternal response to the child's condition. If this is distorted due to the anxiety generated by the interpersonal situation (what Sullivan defines as a bad mother), the activation experience in the child can be distorted in the same way, leading him to "take" the anxiety from the other.
The development of anxiety in Sullivan's model therefore seems to be compatible with modern data from Infant Research. Both the theorists related to the theory of mentalization and the theorists related to the interpersonal-relational perspective believe that anxiety is an affect born within a specific interpersonal context and not the result of excessive libidinal energy not discharged.

The Social biofeedback theory

The social biofeedback theory ideated by Gergely and Watson (1996) explains the child's affective development by integrating

data from developmental psychology, attachment theory and mentalization theory. This theory explores the way in which the child's affective expression and the mother's emotional facial and vocal responses are connected in the child's mind, through a process of contingency. In this way the child associates the control he is able to exercise over the mirroring manifestations of the parents with the consequent improvement of his emotional state. Through this experience of mirroring, the child learns to regulate his own affective states, developing a sense of agency. The caregiver's ability to mentalize, and therefore to tune into the child's affective states, is crucial in regulating the self:

"*The establishment of a second order representation of affective states it creates the basis for affective regulation and impulse control: affects they can be manipulated and downloaded both internally and through action, and they can also be experienced as something recognizable e therefore shared* " (Fonagy et al. 2002, p.341).

As said before, the mirroring process must not only be contingent, but "marked". In fact, according to Fonagy, the mother have to communicate that the feelings she is experiencing are not really her feelings, that is, they do not constitute an indication of how she really feels.

In the absence of markedness, the child perceives the affects projected on the mother's face as not his own. This leads to an increase in emotional arousal, instead of its regulation, its "containment".

The ability to be able to respond adequately to the affective manifestations of the child allows the latter to internalize mental states that can represent and regulate affective processes. In this sense, an adequate synergy is created between affection, body and psyche. However, the mother must also be able, through complex linguistic and semi-linguistic processes, to make her child understand that her behavior and those of others are motivated by beliefs or desires, which constitute mental states. In short, according to Fonagy, only within an adequate intersubjective context can arise a symbolic thought who is functional to the regulation of affects and impulses (Fonagy et al., 2002).

Fonagy's model draws inspiration from Bion's theory of the development of a thinking psychic apparatus (Bion, 1962). The part of the personality that allows to transform the somatic sensations, the affects, in thoughts takes the name of alpha function. For Bion the mother-child relationship is crucial in the development of alpha function. For Bion the affects that are not transformed into thought are called beta elements. According to the author beta elements are at the origin of anxiety, also called "nameless terror".

According to Tronick (2005), the mutual regulation of affective states is indispensable in expanding the "diadic states of consciousness", which contribute to the more complex organization of the infant's mental states. The communicative exchanges, verbal and not, within the relationship of attachment, are essentially aimed at regulating the affective states of the child. Communication is mainly based on the face-to-face exchange between the child and the caregiver. According to Tronick, the infant and caregiver are part of a system of affective communication in which the emotional reactions and affective experience of the infant are determined by the affective expression of the caregiver and by the implicit understanding of that expression by the infant, and vice versa, the caregiver's emotional experience and behavior are determined by the affective communication of the infant.

To illustrate this diadic regulatory process, Tronick devised an experimental paradigm called "Still Face" based on the microanalytic study of face-to-face communication between mother and infant. Several joint states can be encoded between the two: states that may coincide (Match), relatively close states (Conjoint) or distant states (Disjoint) (Tronick, Als, & Adamson, 1980).

Returning to Sullivan's theory on the development of anxiety, it can now be understood how he linked this concept to difficulties on caregiver affective mirroring. From a relational perspective, the affects and behaviors that generate distress in adults are

the result of learning processes related to the first attachment relationship. The concept of signal anxiety as defined by Freud can be reformulated today as an implicit process, probably mediated by the amygdala, which signals those affects and behaviors that have not been adequately reflected by the caregiver, since they have generated in the latter a strong sense of distress.

The contribution of neuroscience: Towards a neuropsychodynamic hypothesis

From a neuroscientific point of view, the amygdala can represent the neuronal substrate involved in the implicit processing of affective stimuli, giving shape from a psychic point of view to what Freud identified with the concept of signal anxiety. The amygdala is a group of interconnected structures that are part of the limbic system (Purves et al. 2017). It represents a center of integration of emotions, in fact, the studies by Downer (1961), and more recently by LeDoux (2015), have allowed us to observe the important role that the amygdala plays in the processing of stimuli endowed with a emotion, especially those related to fear. The amygdaloid complex plays an important role in comparing new stimuli with past experiences, it can be defined as the archive of our emotional memory thanks to the complex interactions with the neocortex and hippocampus. The amygdala analyzes the emotional value of the memories stored in the hippocampus, giving the memory an affective tone. When the amygdala processes a target stimulus, it activates the release of hormones that trigger the fight or flight reaction. According to Solms and Turnbull (2002) the lateral and central nuclei of the amygdaloid complex are the heart of the basic emotional system of fear, the balance between attack responses and escape responses is apparently determined by the interactions between the medial parts and latero-central of the amygdala. From an evolutionary point of view, the fear system allows us to quickly escape from extremely distressing situations, avoiding them even in future situations.

Adolphs, Tranel and Damasio (1994) described a case of a patient suffering from selective bilateral lesions of the amygdala which allows us to observe how this anatomical structure is fundamental in the management of the anxiety-fear system (Panksepp & Biven, 2012). The patient was gifted with a remarkable intelligence, she was a woman able to understand everything at a very high cognitive level, who knew well what the concept of fear was. However, from a perceptive point of view, she could no longer recognize fear in the facial expression of others, nor was she capable of producing a scared facial expression. More significantly, her behavior was totally fearless, which led her to have an excess of trust in others. The life of this patient was marked by the fact that she was unable to activate negative responses in an adaptive way, that is, when such responses were required by the surrounding environment.

The anxiety-fear system is influenced by learning mechanisms, in fact, although it is an innate system, it is susceptible to life experiences, especially early ones. Within the system, representations are formed that are mediated by the intersubjective context in which the individual is inserted, as Sullivan (1953) observed anxiety can be learned in the interpersonal context. An emotional mirroring that is not very congruent with certain internal states of the child, characterized above all by an anxious state on the part of the caregiver, can trigger implicit learning processes in which these internal stimulations are associated with fear responses.

LeDoux's studies (2015) have allowed us to observe that in part the assessments of the amygdala towards specific stimuli depend on the subject's evolutionary history. The connections that associate the noxious stimulus, or the object to be afraid of, with the responses of fear-anxiety are connections that are established extremely quickly, and are then kept outside one's own consciousness, that is, they are unconscious. After a stimulus,

which can be external or internal, is associated with a painful experience, the fear system is immediately and automatically activated each time that stimulus is encountered again, even before it is consciously recognized. This form of learning is mediated by a "fast and imprecise" neuronal path in which the amygdala transmits information to the periaqueductal gray completely excluding cortical consciousness, which explains why some people may feel anxious without knowing why, in these subjects anxiety is associated with a learned unconscious representations (Solms and Turnbull 2002). In particular, according to Schore's research (2003), the right hemisphere plays a key role in the implicit processing of affective stimuli.

According to Schore (2003) early failed experiences in the first relationships with the caregiver lead the subject to resort to dissociation as an affective self-regulation strategy. The affects are thus evaluated negative by the subject based on the caregiver's response. Adopting the neuroscientific point of view it can be said that traumatic attachments form stressful affects induce maladaptive responses from the neurophysiological point of view. It should be remembered that it is not a question of examining only the verbal or explicit reactions of the caregiver, but above all it refers to pre-verbal reactions such as facial expressions, prosody and gestures, which can unconsciously communicate a sense of discomfort in the comparisons of the affective states shown by the child. As LeDoux (2015) observes, the intersubjective context can contribute to the conditioning of the amygdala towards those affects that in dysfunctional relationships have not received the right mirroring, that tender behavior emphasized by Sullivan.

By adopting a neuropsychodynamic point of view, the affects and behaviors which the caregiver responds with anxiety do not allow the child to acquire an adequate capacity for affective regulation, forcing the latter to have to dissociate such affective experiences that have not received adequate parental mirroring , in this case the child is forced to implement internal defensive operational models against such dissociated affects, such as anxious avoidant, anxious ambivalent and disorganized attachment. The concept of dissociation referred to here is the one proposed by relational psychoanalysis, especially by Bromberg's theory (1998) in which dissociation becomes a constitutive process of the mind, and that only in the case of psychopathology does it become dysfunctional, not allowing the adequate management of the affects linked to specific states of the Self.

The states of the Self not mirrored by the caregiver generate in the child, as described by Sullivan (1953), a state of anxiety processed by amygdala. Those dissociated traumatic memories compromise the individual adaptive abilities (Mancia 2005). In relational terms, danger is not associated with the return of the repressed drives, as Freud (1933) had stated, but rather with the possibility of being able to relive those affective experiences that have not been adequately reflected, and that have been implicitly associated with the system of fear through the amygdala.

Relational trauma, attachment and amygdala

In the development of traumatic memories, associated with the development of signal anxiety, the concept of relational trauma developed by Hill (2015) becomes relevant. For the author, referring to the neuroscientific research of Schore (2003), relational trauma is a chronic misattunement of affective states in the attachment relationship[1]. It is an

[1] According to Bowlby (1988), attachment behavior is that form of behavior that manifests itself in a person who follows or maintains a closeness to another person believed to be able to face the world appropriately. Ainsworth (1978) identified three major models of attachment: the first called sicure attachment in which the individual has confidence in the availability, understanding, and help that the parent will give him in case of adverse situations. The second called ambivalent attachment in which the individual does not

invisible trauma, not clearly evident, in which persistent difficulties in affective attunement on the part of the caregiver lead to psychoneurobehavioral defects in the primary emotional regulation system. From a neurobiological point of view, this difficulty would be mediated by the amygdala which processes those affects linked to traumatic relational memories as a signal of anxiety. According to Hill, the different forms of insecure attachment, which can be re-conceptualized as defensive behaviors (Fonagy, 2003), impair the ability to regulate affects in various ways. Avoidant attachment predisposes the child to respond to stress through hypoarousal strategies, mediated by the parasympathetic system. Ambivalent attachment, on the other hand, leads the subject to respond to stress through hyperarousal strategies, mediated by the sympathetic system. Finally, the trauma related to disorganized attachment is more serious than those already described, in fact the disorganized adult responds to stress through extreme forms of hyper- and hypo-arousal, witnessing a simultaneous activation of the parasympathetic and sympathetic system.

Relational trauma would thus give rise to dissociated states of the self, encoded in traumatic memories by the amygdala, which would be managed in a dysfunctional way by the different forms of insecure attachment. From a neuroscientific point of view, the amygdala unconsciously evaluates external stressors that can reactivate internal traumatic experiences, activating the individual's usual defensive modalities. While subjects with secure attachment are able to implement flexible and adaptive behaviors, making use of adequate mentalization skills, those who are characterized by forms of insecure attachment put in place rigid defenses that prevent adaptation to different relational contexts.

Leigh McCullough: Affect phobia

Recently, psychologist Leigh McCullough (2003) introduced the concept of "affect phobia" in order to re-conceptualize the classic concept of intrapsychic conflict in the light of the theory of affective regulation. According to McCullough, by integrating the behaviorist theory with the new dynamic perspectives, phobic reactions do not develop only in relation to external stimuli but also towards internal ones, that is the affects. In a specific relational environment, certain affects can be associated with dysfunctional emotions, such as anxiety or shame. According to the author, the sense of guilt, anxiety and shame can be conceptualized as inhibitory affects, which can counteract the expression of other affects.

McCullough's theory (2003) is in line with what has been exposed so far in this article, in dysfunctional relationships the affects of the child can be associated with anxiety due to traumatic relational models in which the caregiver has not shown adequate empathic mirroring. This form of learning, mostly unconscious, would be mediated from a neurophysiological point of view by the amygdala, a structure that plays a fundamental role in the processing of affective stimuli, and whose representations are susceptible to the life history of the subject.

In line with McCullough, the intrapsychic conflict is not the result of endogenous instinctual drives that seek a way of discharge, but the result of the association between inhibitory anxiety and affects. It is thus possible to observe how the relational-intersubjective context shapes those intrapsychic dynamics that have always been discussed by classical psychoanalysts.

The term phobia is used by McCullough as a metaphor to express the avoidance of affective stimuli by individuals with various psychopathological disorders. For the author,

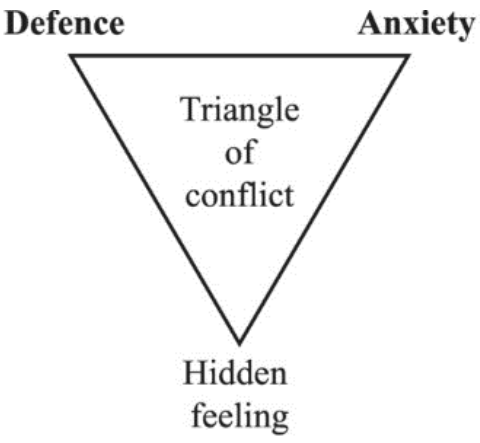
have the certainty that the parent is available or to give help if called into question. The third called avoidant attachment in which the individual expects to be rejected by the caregiver. Subsequently, Main (Main & Solomon, 1986) identified another attachment pattern called disorganized in which the individual manifests a contradictory and stereotypical behavior towards the caregiver.

the therapeutic goal is to provide a new relationship that allows the subject to desensitize phobic affects, that is, a relationship that allows the dissolution of those affective conflicts born in specific traumatic relational contexts.

A new theory of conflict

Ezriel in 1952 introduces the conflict triangle (figure 1), later taken up by Malan in 1979. According to Malan this triangle partially summarizes a cardinal principle of psychodynamic psychotherapy. In the triangle of conflict at the extreme left there are the Defenses (D), at the extreme right the Anxiety (A) and at the lower extreme the Impulses and unconscious Feelings (I / S).
In every psychodynamic therapy the patient is helped to recognize their own dysfunctional defenses put in place to protect themselves from the awareness of their own drives that are a source of anxiety. Malan's scheme, although anchored to a mono-personal vision of psychic conflict, is an excellent reference to summarize what has been said so far. From a relational point of view, the affects that generate anxiety or stress are those internal stimuli that have been associated with the fear system, through the mediation of the amygdala.

Figure. 1 Malan conflict triangle



In a maladaptive context, the subject responds to these stimuli with defensive responses which, from a behavioral point of view, manifest themselves with forms of insecure attachment, which will then be internalized in internal operational models that give shape from the intrapsychic point of view to the various defense mechanisms highlighted by the classical psychoanalysis. In other words, the intrapsychic conflict as represented graphically by Malan is the result of implicit learning processes that originate in the intersubjective context, determined by the child's primary need for attachment. Similarly, McCullough (2003), more simply, defined conflict as the result of an unconscious association between affect and aversive response, in this case from the activation of the fear system.

Conclusions

This article has attempted to bring together different perspectives born in both psychoanalytic and neuroscientific fields on a crucial issue for psychopathology, namely that related to the regulation of anxiety. Psychoanalytically oriented clinicians have always been interested in how the subject regulates his own feelings of anxiety associated with the drives coming from the Id. In particular, classical psychoanalysis has focused its attention on how the Ego, from an evolutionary perspective, masters the instinctual drives of the Id through defensive mechanisms that gradually become more adaptive. In doing this, however, psychoanalysis has not taken into account the environmental-relational factors that intervene in the management of affects, and specifically in the learning of aversive responses characterized by anxiety. As Morris Eagle (1993) observed, it almost seems that for classical psychoanalysis the instinctual drives of the Id are intrinsically enemies of the Ego.
From this point of view, the research born in the neuroscientific field becomes important for psychoanalysis only if we refer to the relational movement, in which the intersubjective context becomes fundamental in the genesis of all those intrapsychic phenomena described by classical psychoanalysis. For example, the idea that the amygdala can represent the neuronal substrate

of the concept of signal anxiety takes on an important meaning for psychoanalysis only if we refer to the concept of signal anxiety as the result of implicit learning processes related to the intersubjective context of the patient.

However, this article has several limitations, first in psychoanalytic field the concept of anxiety takes on different meanings based on the theories proposed by the different authors, making it difficult to define univocally what anxiety is. In this article, reference is made to Freud's definition of anxiety, which in 1926 defines anxiety as a signal put in place by the Ego in front of a dangerous situation in order to avoid being overwhelmed by the influx of excitations related to a previous traumatic situation. By traumatic situation we mean a non-controllable influx of too numerous and too intense excitations. As I have emphasized several times in this article, from the relational point of view, the out-of-harmony between caregiver and child must be considered as a traumatic situation, out-of-harmony that produces traumatic memories, very often dissociated, which are managed by the amygdaloid complex.

A second limitation of the article consists in the not easy overlap between psychological concepts and studies related to neurobiology, although they may be compatible, there is always a gap linked to the patient's subjectivity, something that psychoanalysis has always tried to investigate with its own method. It is important, however, that psychology, especially dynamically oriented psychology, dialogues with affective neuroscience, being able to explain the "tools" through which psychic facts are manifested, even if by adopting this method one can easily commit a oversimplification of mental functioning.

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