

Chapter 11

THE COGNITIVE EFFECTS OF ANXIETY ON SEXUAL AROUSAL

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Anxiety is a recognised etiological factor in the domain of sexual dysfunctions. Previous researches have reported reduced sexual responses in individual suffering from anxiety (Bodinger et al., 2002; Leiblum et al., 2007; Meana & Nunnick, 2006; Purdon & Holdaway, 2006; Rellini, 2008.) Whether this is caused by concerns regarding self-image, one's physical appearance, one's performance as a lover or the fear of getting pregnant, or fears of being abandoned or worries relating to everyday difficulties, or whether it is the result of a social phobia, a panic disorder or a history of sexual abuse, all the observations converge towards one point: anxiety and sexual stimulation are not a good match.

Among clinicians, it was widely believed, for a long time, that anxiety was an antagonistic state of sexual responses. Many authors have theorised on this issue. The most well known, Masters and Johnson (1970) described the now famous performance anxiety mechanism: worried about their sexual performance, dysfunctional patients cannot indulge in pleasure; they behave like a worried spectator, concerned about their own performance, thus managing to inhibit the sexual responses for which they are hoping and praying. This form of vicious circle was presented as the primary cause of chronic sexual dysfunction. In 1974, Kaplan pointed out that other causal factors were sometimes added to the anxiety of performance, which were more deeply rooted in the history of the subject but also related to anxiety: the fear of intimacy, for instance, the feeling of guilt associated with sexuality or the fear of being abandoned. The fact is that up until quite recently, clinicians tended to represent anxiety and sexual arousal as irreconcilable states. They were more or less explicitly inspired by the works of Wolpe (1958) on reciprocal inhibition. The principle of reciprocal inhibition postulated an incompatibility between certain neurovegetative states. Specifically, anxiety, a state where the activity of the sympathetic system predominates, was considered to be incompatible with sexual arousal, whose initiation requires parasympathetic activity. According to Wolpe (1958), anxiety and arousal states are mutually exclusive. Wolpe's

theory attributes the inhibitory effect of one state upon the other to a direct physiological causality effect.

In the beginning, the theory of reciprocal inhibition was very appealing to clinicians sensitive to the almost constant presence of elements of anxiety implicit in functional problems. However, beyond the field of sexual dysfunctions, various elements caused doubt regarding such a simple and direct inhibitory relationship. First, several anecdotes evoked the possibility of sexual arousal stimulated by stress. For examples, stories of lovers who were stimulated by the fear of being caught in the act, stories of couples where sexual relations following a “good old” argument were all the more intense, or stories of rape carried out in the heat of anger. Clinical observations then became systematic. Since the work of Marshall, Laws & Barbaree (1990), we now know that certain types of criminal sexual behaviour are stimulated by stress or are the result of humiliation. It is also the case for certain cases of paraphilia and for compulsive sexual behaviour where stress is often a trigger (Bancroft & Vukadinovic, 2004; Kafka, 2007). Moreover, surveys carried out among the general population also showed that anxiety and arousal can sometimes go hand in hand. For instance, the survey published in 2003 by the Bancroft team showed that 28.3 % of the interviewed men have reported that anxiety put a strain on their sexual interests, while 20.6 % considered it to be stimulating. Twenty percent is fairly significant. It is highly unlikely that we are only dealing with marginal cases of compulsive or deviant sexuality. The survey by Lykins, Janssen and Graham carried out in 2006 on female students also showed similar results. In this survey, 10 % of the students reported to be sexually stimulated by anxiety. Clearly, anxiety is not only an antagonist of sexual functioning; it can also, and quite often, be an agonist. This rapidly led to the belief that anxiety-arousal relations were probably more complex than the reciprocal inhibition theory suggested. During the last two decades, we have gone from a theory centred on inhibition and the peripheral physiological mechanisms to a theory insisting more on the complexity of the relations between the two states and on the cognitive explicators.

THE CONTRIBUTION OF PLETHYSMOGRAPHY

As mentioned above, the observations made outside the field of sexual dysfunctions have cast doubt on the theory of reciprocal inhibition. Consequently, numerous studies have investigated the understanding of anxiety-arousal relations. In this context, the plethysmographic techniques were often employed. Plethysmography allows sexual arousal to be assessed in a subject by providing a direct description of the person’s state. The level of arousal is inferred from genital vasocongestion. In men, a sensor ring is fitted around the penis; it is sensitive to variations in pressure, thus allowing the tumescence of the organ to be measured. This is what is known as *penile plethysmography*. In women, a vaginal probe sensitive to colour variations in the wall of the vagina allows the extent of the blood flow in this area to be determined. This is *vaginal photoplethysmography*. The measurements generally take place when the subject is exposed to erotic stimuli, either audio (recorded material) or video (explicit films).

Initial Experiments

The first experimental arguments against the theory of reciprocal inhibition were put forward by Hoon, Wincze and Hoon in 1977 on female subjects, and by Wolchik et al. in 1980 on male subjects. They were reproduced in 1990 by Palace and Gorzalka on a sample of women. In these experiments, before viewing erotic images, half the subjects were exposed to an emotional film that induces anxiety (accident scenes), and the other half of subjects were exposed to an emotionally neutral film (the control condition.) The participants' sexual arousal was measured. The result showed that sexual arousal among participants firstly exposed to anxiogenic stimulus was not inhibited compared to participants firstly exposed to a neutral film. On the contrary, in the studies by Hoon et al. and Palace and Gorzalka, the initial exposure to an anxiogenic stimulus even seemed to facilitate arousal. Such results did not support the idea of an incompatibility between anxiety and arousal states. The observed priming effect of the one on the other observed in women even tended to support the opposite theory of psychophysiological processes common to both states.

Sympathetic Activity

Sympathetic activity was considered by Wolpe as the physiological foundation of the anxious inhibition of sexual reactivity. The experiments of Hoon et al. and Wolchik et al. did not completely invalidate this mode of action. Indeed, it was possible that the so-called anxiogenic stimuli did not provoke a sufficiently intense sympathetic reaction to exercise an inhibitory effect on arousal. However, Lange et al. (1981) and Meston and Heiman (1998) had directly stimulated the sympathetic system using chemicals. Lange and his team injected male subjects with effective doses of epinephrine, a sympathicomimetic substance, just before being exposed to erotic films. They compared their sexual arousal with subjects receiving an injection of a placebo. No difference emerged. Their results were in line with the results of Wolchik's previous studies (1980). Meston and Heiman (1998), administered ephedrine, another sympathicomimetic substance to female subjects and reported a slight increase of arousal compared to the placebo group. Here, the results were the same as those of the initial experiment by Hoon et al. (1977). Similar results were also obtained by Meston and Gorzalka (1995, 1996) where the sympathetic activity of female subjects was induced through physical exercise. In conclusion, it appears that anxiety and the accompanying sympathetic activity are perfectly reconcilable with sexual arousal; they may even slightly encourage it: this is far from the principle of reciprocal inhibition.

Experimental Reproduction of Performance Anxiety

Wolpe's theory is clearly not the most pertinent theory to explain the links between anxiety and arousal. However, anxiety is definitely almost a constant in clinical dysfunctional tables. Therefore, it is possible that sexual anxiety has particularities that distinguish it from other negative emotions. The inhibition of arousal could be the result of perceptual and cognitive components specific to performance anxiety. Masters and Johnson, who considered performance anxiety to be the main factor responsible for arousal problems, insisted on the

specific attitude caused by this type of fear: the patients became *spectators* of their own performance rather than the *actors*. Isn't it this particular mental state that characterises sexual anxiety and renders it incompatible with sexual arousal?

In order to test this hypothesis of a specificity of performance anxiety, Barlow, Sakheim and Beck attempted to reproduce the appearance conditions in an experiment in 1983. They measured arousal in male subjects who were given erotic films to watch after they had been threatened with electric shocks if their erectile performance did not reach an acceptable level. Arousal in these subjects, who were supposedly made anxious regarding their sexual performance, was compared to the arousal of subjects, on the one hand, who were also threatened with shocks but not in relation to their erectile performance, and, on the other hand, to subjects who had not been threatened. The purpose of the study was to compare the respective impact of performance anxiety (first condition), anxiety not linked to performance (second condition) and the absence of anxiety (third condition). The results were completely opposite to what the clinical considerations of Masters and Johnson predicted. Not only was sexual arousal greater in the threatened subjects compared with those who had not been threatened but, what's more, sexual arousal in the subjects threatened in relation to their erectile performance was even greater than in the subjects who were threatened, though not in relation to their sexual responses.

In 1990, Hale and Strassberg operationalized performance anxiety in a slightly different way. Male subjects were exposed to erotic stimuli. The sexual anxiety was provoked by somewhat hurtful intervention of an experimenter after an initial phase of plethysmographic measurements: when the experimenter examined the first set of results, he pretended to be disappointed that the level of erection achieved was lower than normal. The experiment then continued and the arousal obtained during the second phase of the experiment by the supposedly disconcerted subjects with respect to their sexual performance, was compared with the control subjects; on the one hand, the subjects who were made anxious without any link to erectile performance (threat of electric shocks independent of the levels of erection) and, on the other hand, subjects who were not made anxious. Contrary to Barlow et al., (1983) Hale and Strassberg (1990) observed an inhibiting effect on sexual arousal caused by stress. However, the mode of anxiety induction had no specific effect: the subjects who were made anxious in relation to their erectile performance or in relation to the possibility of an electric shock showed equivalent levels of arousal, in both cases lower than the control subjects who suffered no pressure or threats.

In 1997, Elliot and O'Donohue carried out a similar experiment with women. Performance anxiety was induced by making the subjects believe that the experimental session would be filmed on video. Research assistants would watch the recordings later and assess the subjects according to levels of "attraction", "personality" and "body language". This procedure did not provoke any significant reduction in sexual arousal: it remained equivalent to that of the control subjects.

In conclusion, the results from these three experiments do not support the hypothesis of a particularity of performance anxiety that endows it with an actual inhibitory effect on sexual arousal.

The Exception of Dysfunctional Subjects

In experimental conditions, anxiety does not appear as a typically inhibitor variable of sexual responses. Further, the links to performance changes nothing. In most plethysmographic studies, it has no impact on arousal, in fact, if anything, it encourages it (Barlow, Sakheim & Beck, 1983; Elliot & O'Donohue, 1997; Hoon, Wincze & Hoon, 1977; Lange et al., 1981; Meston & Gorzalka, 1996; Meston & Heiman, 1998; Palace & Gorzalka, 1990; Wolchik et al., 1980). It is only in Hale and Strassberg's study (1990) that it seemed to act against arousal. However, clinicians tended massively to consider anxiety as one of the major causes of sexual dysfunction. Were clinical intuitions really so wrong? Or maybe the inhibitory effect of anxiety is due to particularities present in clinical subjects and not in experimental subjects?

The results from an experiment conducted in 1987 by Beck, Barlow, Sakheim and Abrahamson on clinical subjects support this hypothesis. The authors have employed the paradigm of the threat of shocks used by Barlow et al. in 1983. They compared plethysmographic measurements taken on men with non-organic erectile problems with those from men with no history in erectile dysfunction. Like Barlow et al. in 1983, they noticed that anxiety induced by the threat of shocks in non-clinical subjects had no effect at all or even slightly facilitated arousal; however, in dysfunctional subjects, it clearly had an inhibitory effect.

The results from Palace and Gorzalka (1990, op. cit.) and Meston and Gorzalka (1996, op. cit.) also support the theory of a different response to anxiety in dysfunctional subjects. The priming effect of anxiety on arousal observed in non-clinical female subjects was not observed as clearly in women suffering from a functional orgasm disorder.

Overall, these results corroborate the clinical point of view of anxiety being responsible for sexual dysfunctions: anxiety can well and truly have an antagonistic effect on sexual responses; only, the anxiety-arousal relationship is not as simple and linear as initially suggested. To be specific, the inhibitory effect of anxiety probably requires the intervention of a third-party mechanism. If this mechanism is absent, as would be the case in most non-clinical subjects in the plethysmographic experiments, then anxiety has no impact on arousal, or even potentialises it, and if it is present, which would be the case in dysfunctional patients, then anxiety inhibits arousal. This raises the following question: what is the third-party mechanism without which anxiety does not inhibit anything?

Cognitive Interference

Several studies converge towards designating *distraction* as an agent that is directly responsible for the inhibition of sexual responses.

In 1976, Geer and Fuhr had shown that arousal in male subjects exposed to erotic recordings diminished when they were subjected to distracting auditory stimuli at the same time. In 1979, an experiment by Farkas, Sine and Evans led to the same observation. In 1985, Adams, Haynes and Brayer showed that the same was true in female subjects.

Based on a literature review carried out by Barlow's team between 1985 and 1994, Sbrocco and Barlow (1996) concluded that distraction brought non-clinical subjects down to the same level of sexual arousal as clinical subjects affected by anxiety, the idea being that

the latter were already distracted by their anxious preoccupations alone. All in all, what distinguishes functional and dysfunctional subjects for Sbrocco and Barlow, is neither the presence of anxiety nor its intensity, or even the fact that it is related to performance – this seems commonly experienced by non-clinical subjects without this disrupting their sexual responses – but the fact that it has this particular power in dysfunctional subjects to divert their attention towards non-erotic considerations (e.g. a negative self-image, their partner's disappointment). The cause of sexual dysfunctions is now conceived in terms of cognitive interference. From this point of view, anxiety indirectly explains functional problems: it encourages interference, i.e. it diverts the attention from erotic stimuli to non-erotic stimuli, but it is neither a sufficient nor necessary condition to inhibit arousal. It is insufficient because anxiety cannot interfere with the attention dedicated to the erotic situation; in this case, it has no effect, and it is not necessary because stimuli and thoughts other than anxiogenic can also create an interference, mobilising attention to the detriment of the erotic situation.

The inhibitory role of cognitive interference was again confirmed by Elliot and O'Donohue (1997, op. cit.). As mentioned above, the anxiety induced in this study on female subjects had no influence on their arousal. However, the experiment also had a second aim which was to assess the effect of distracting stimuli. While viewing erotic recordings, some subjects had to listen to sentences and repeat them according to more or less simple or complex instructions. Here, the effect was clearly significant: the inhibition of arousal was directly proportional to the level of distraction.

Contrary to distraction, anxiety has therefore no specific inhibitory effect. When anxious subjects have a reduced level of arousal, anxiety has obviously provoked the diversion of their attention from the erotic situation. This cognitive way of thinking also provides elements that explain the atypical results of Hale and Strassberg's study (1990, op. cit.), one of few to have found that anxiety induced through experimental manipulation gave rise to a reduction in sexual responses (see above). When questioned about the thoughts they had during the experiment, the stressed subjects' answers were quite distinct from those of the control subjects owing to the higher number of non-erotic preoccupations that had attracted their attention (i.e. "Why didn't I get an erection?", "Will the electric shock hurt me?")

Finally, in 2001, Koukounas and McCabe observed that sexual arousal in male subjects exposed to erotic films strongly correlated with the impression they said they had of their attention being fully absorbed by the film.

Finally, these studies have led to a better understanding of the nature of the anxious inhibition of sexual responses. We now think that cognitive interference is the true *modus operandi*

TOWARDS A COGNITIVE THEORY OF THE AROUSAL-ANXIETY RELATIONSHIP

It is now clear that anxiety can have various influences on arousal: it can have an inhibitory effect, via *the interference effect*, or play the role of facilitator, known here as the *priming effect*. Besides the studies that relate directly to sexual arousal, an additional series of work and concepts have enabled us to specify the possible nature of cognitive mechanisms

involved in priming and interference effects. A cognitive theory of the arousal-anxiety relationship has begun to take shape.

The Priming Effect

Plethysmographic studies have not merely shown that, in the absence of the interference vector, anxiety and arousal remain perfectly compatible, they have also shown that the first could even have an agonistic effect on the second. The increase in sexual reactivity observed in subjects exposed to experimental conditions (Barlow et al., 1983; Hoon et al., 1977; Meston & Gorzalka, 1995, 1996; Meston & Heiman, 1998; Palace & Gorzalka, 1990) effectively provides objective support for the feeling reported by numerous people that stress in fact favours arousal. All that remains is to explain this effect. Various models elaborated in the domain of the psychology of emotion help to elucidate the issue.

It is now established that the production of emotions is a process comprised of several stages (Damasio, 2003; LeDoux, 1996). Firstly, a rapid and mostly unconscious analysis of the trigger situation is made. The operation mainly takes place in the amygdale; this is at the origin of a somewhat undifferentiated primary physiological reaction, essentially comprised of vagal modifications. Secondly, cortical connections come into play and determine a secondary processing of the stimuli during which the emotion is adjusted, specified and led to consciousness. At this stage, the information from the environment (signs of danger for instance, or indications of a pleasant event) will direct the interpretation of the experience, giving it a particular affective character (sometimes worrying, sometimes exciting). At the same time, the information concerning the internal state (primary vagal modifications) confirms the emotional nature of the situation: "I can feel that it is affecting me". Thus, through an interactive process, the particular physiological and subjective characteristics of the emotion are revealed. The same is probably true for sexual arousal: internal feelings and the erotic stimuli mutually guide each other to create a specifically erotic emotion.

In numerous situations of everyday life, we can observe a coupling mechanism between the characteristics of the trigger stimulus and the primary physiological reaction. External and internal stimuli in some way mutually confirm each other, leading to the emotional experience. During this process, biases can however occur: the coupling normally expected between the primary physiological reaction and the characteristics of the trigger situation can indeed be altered by the intrusion of information that is foreign to the initial conditions. Thus, unexpected emotions are produced. Two experiments illustrate this bias in the sexual domain; their results showed that the sexual emotion can be caused by elements that are completely foreign to erotic stimuli. As such, they give us an idea of the mechanisms that probably contribute to the element that prime arousal through anxiety.

1. Valins (1972) reports having exposed male subjects to erotic slides. During this time, a device measured their heart rate and they were made to listen to the sound of their own heartbeat. At least that is what they thought because, in reality, the heartbeats they heard were manipulated by an experimenter who made the rhythm vary at random, increasing it when certain images were shown and reducing it for others. When they were asked to point out the photos they liked the most, the subjects

showed a tendency to select those that were associated with a pseudo-modification of their heartbeat.

2. In an experiment conducted in 1974 by Dutton & Aron, male subjects had to cross a footbridge that overlooked a canyon. Straight after this stressful ordeal, an interview took place with a female researcher. During the interview, the researcher asked the subjects to make up a story based on the drawing of a woman, then, when they had to leave, she gave them her card. Compared with subjects who had the same interview with the same researcher, though without having had to cross the harrowing footbridge beforehand, a significantly higher number of the stressed subjects made up stories with a sexual content and contacted the researcher afterwards in the hope of seeing her again.

These two experiments showed that the sexual emotion may be encouraged by the perception of a physiological activation whose origin is absolutely not erotic. Produced through arbitrary manipulation by Valins or through a sensation of fear by Dutton and Aron, the perceived physiological activation is coupled with a sexual stimulus that is foreign to its cause but concomitant in such a way that the emotion develops or reinforces itself in a sexual direction. This mechanism probably also plays a role in the priming elements revealed by the plethysmographic studies: the physiological activation induced by stress is attributed to an erotic source, with the result of encouraging the emotion and sexual responses.

Sexual arousal is an experience that results from the converging interpretation, in an erotic sense, of a series of signals from both the internal and external environment. To be exact, it should be noted that the genital vasocongestion reaction does not signal the end of the arousal process. It is merely a stage in a process that is only finally expressed with the subjective sensation of arousal. The reader will undoubtedly have noticed that, without it being their exclusive privilege, the priming effect seems to be more widespread among women. At the same time, the genital reaction measured by plethysmography in women is not necessarily accompanied by a conscious impression of arousal. In men, on the other hand, there are quite good correlations between plethysmographic measurements and subjective feeling of arousal. This inter-gender difference can undoubtedly be explained through the more external location of the male genital organs: this anatomical data means that in comparison to women, men have a greater number of perceptive retroactive channels; the physiological signs of their arousal are more accessible via the visual channel and tactile sensations, which all allow a closer adjustment of genital and subjective responses. Probably as a result of this, genital vasocongestion in women appears to be a less specific response of arousal, less differentiated or less accomplished than it is in men (Chivers, 2005). Regardless of gender difference, the relative imbalance between the genital response and the subjective feeling bears witness to the sequential nature of the sexual arousal process. From the primary physiological response to the subjective experience, arousal is an experience that occurs progressively, during cognitive processes of increasing complexity and through certain hazards such as possible attribution biases.

The Effect of Interference

Anxiogenic stimuli are not always interpreted in a pro-erotic sense. The priming effect of arousal through anxiety is not an absolute. It clearly is not the case in numerous individuals suffering from a functional arousal or orgasm disorder. For these people, sexual inhibition based on anxiety remains a tiresome reality. However, the explanation of the phenomenon no longer refers to an improbable physiological incompatibility of the two states but rather cognitive interference.

In individuals suffering from sexual dysfunction, the anxiety that occurs in a sexual situation seems to act as a source of distraction; it triggers an intense cognitive activity, focused on danger, which interferes with the processing of erotic stimuli. Typical sexual anxious preoccupations – “Is it going to work?”, “What does my partner think of me?” – or even everyday concerns, sometimes have this ability to overwhelmingly monopolise the subject’s attention, to the point where the remaining resources are insufficient to ensure the normal execution of a sexual response. Therefore, it is not stress in itself that is the efficient inhibitory factor but the degree of distraction that it causes in certain people.

Erotophobia and Emotional Stroop

Not everyone is as vulnerable to the effects of anxious interference. People who risk suffering from sexual dysfunction seem to have a particular profile that Byrne and Schutle (1990), and later Sbrocco and Barlow (1996), qualified as *erotophobia*. Erotophobia consists of a tendency to associate sexuality with ideas of danger. There is a cognitive and emotional structure similar to the one that can be found in numerous anxiety disorders, though in this case, the object is sexuality. Therefore, it is a *phobia* linked to sexuality.

It has now been demonstrated that, in anxious individuals, the cognitive processing of a stimulus in relation to their emotional difficulties is far more costly in terms of attention than the processing of the same stimulus in a person who is not anxious. This phenomenon was objectivised using a variant of the Stroop test called *emotional Stroop*. Through the Stroop test, it is possible to measure the interference of one cognitive activity over another. In its classic form, the test consists of presenting the subject with a series of written words using different coloured ink; the person is instructed to name the colours of the inks used and not to read the words. The examiner takes note of how quickly the instruction is obeyed to name the colours, knowing that this speed depends on the ease with which the subject manages to inhibit the execution of an interfering activity, i.e. an automatic tendency to read the words presented. The effect of interference of reading over naming the colours is measured here in time units: the greater it is, the more time will be required to execute the instruction. Reading has become automatic in almost every literate person who is exposed to written words, and it is this automatic behaviour which, in the Stroop test, creates an activity that is capable of interfering with another, less banal activity, such as naming font colours. As regards the emotional Stroop, it introduces an additional variable, the affective connotation of the words given to read. This Stroop variant shows that the effect of interference also depends on the emotion – anxiety in particular – caused by the stimulus. For instance, in anxious people suffering from social phobias, that is who are anxious in social relations, concerned about rejection, they need more time to name the colour of ink that is used to write a critical word

such as “humiliation”, than to name the colour of an affectively neutral word such as “geology”. However, this difference in reaction time is not found in people who do not suffer from a social phobia (Mattia, Heimberg & Hope, 1993). In the same way, there are longer reaction times in people with arachnophobia, with words such as “spider” or “web” (Lavy, Van den Hout & Arntz, 1993); or with words such as “suffocate” in people who suffer from panic disorder (McNally, Riemann & Kim, 1990); with words relating to a trauma experienced by the subject (e.g. “rape”, “Vietnam”) in the case of post-traumatic stress disorders (Kapsi, McNally & Amir, 1995; McNally, English & Lipke, 1993); and with words such as “accident” in people suffering from generalised anxiety (Martin, Horder & Jones, 1992). In anxious people, the reaction times are systematically longer for words that evoke their specific concerns. The effect of interference due to the emotional load of the stimulus leads us to believe that in people who are sensitive to it, some specific themes provoke an automatic cognitive activity centred on the notion of danger. Absorbing a significant amount of the subject’s mental resources, this activity hinders the achievement of another task.

To our knowledge, erotophobic subjects have never been assessed using emotional Stroop-type tests, which would target words that evoke sexual situations. However, it would not seem to be excessively rash to suppose that the same would be true for these people as for other anxious subjects. Therefore, Kempeneers and Barbier (2008) suggest considering erotophobia as a factor of cognitive interference. In a sexual situation, erotophobic subjects would tend to develop a cognitive activity focused on the notion of danger. Encroaching upon the resources allocated to the processing of the situation’s erotic components, this activity would lead to an increased risk of sexual dysfunction in these subjects.

The Working Memory

The inhibitive power of distraction leads us to consider that these people are endowed with a limited ability to process information. Above a certain quantitative threshold, the cognitive resources required to process a second supposedly distracting stimulus (i.e. non erotic) must be taken from those allocated to the processing of a primary stimulus (i.e. erotic). The concept of *working memory* seems to be adapted to the description of the process. According to Eysenck (1991) and Peretti & Ferreri (2004), in people suffering from chronic anxiety who are confronted with sensitive themes, it is as though the working memory is saturated by information relating to the management of a source of danger, to the point where the execution of other tasks is altered. The working memory is a concept that was proposed and developed by Baddeley (Baddeley, 1992; Baddeley & Hitch, 1974). On a schematic level, it can be compared with the random access memory of a computer. It is the functional entity that allows you to momentarily keep in mind elements of information that are useful to accomplish a task. These elements are taken from the external environment on the one hand – an erotic stimulus for instance – and from the internal environment on the other hand – memories of similar experiences, schemas of actions learnt, moral values evoked by the situation, etc. Contrary to other forms of memory allocated to storing information in the long term, the working memory functions in a transitory way. The information only spontaneously remains for a few seconds. This goes hand in hand with its limited availability: the mass influx of new information tends to suppress those relating to the tasks in hand. In the terms of this model, anxiety provokes a saturation of the working memory in erotophobic subjects to

the detriment of the resources essential to the execution of sexual responses. Elements of information relating to the management of danger come to the fore and compete with the erotic information.

The Attentional Benefit of Anxiety

The work of Mandler (1984) on the attentional effects of emotions is also of interest. According to Mandler, stress always has the effect of increasing vigilance. This explains why anxiety can sometimes facilitate the execution of certain tasks. In 1908, Yerkes & Dodson had pinned down the non-linear character of the relationship between stress and the level of performance to tasks requiring attentional functions: stress was sometimes detrimental to performance, and sometimes it improved it. It seemed to the authors that the optimal level of performance resulted from moderate stress rather than the absence of stress, and that a level of stress that was too high tended to exert a detrimental effect on performance. In reality, Mandler specified in 1984 that the intensity of the emotion is probably not the decisive variable concerning the evolution of the performance; instead, it is the element on which the increased attention provoked by the stress is focused. If it is focused on the elements relating to the task in hand, it logically produces an increase in the level of performance. If, on the contrary, it is focused on elements that are external to the accomplishment of the task, then the subject is distracted and his/her performance is poorer. It is easy to transpose Mandler's model to the area of sexual performance. When anxiety suddenly appears in a sexual situation, there are two possible scenarios:

1. The majority of the subject's attention may be drawn to elements of danger that are foreign to the erotic task in hand. His/her working memory is saturated with information of a non-erotic nature resulting in a reduction in sexual performance. This is a case of the interference effect which can be found in stressed erotophobic subjects in a sexual situation.
2. In the absence of such a mechanism that shifts the cognitive resources, attention is maintained on the information of an erotic nature. This information thus benefits from a positive attentional balance that can result in an improvement in sexual performance. Under these conditions, a priming effect is obtained. This tendency would be more likely to occur in non-erotophobic subjects.

It should be noted that the model elaborated based on the work of Mandler is situated at the opposite end of the scale to Wolpe's. While the latter considered anxiety and arousal to be natural antagonists, the former tends to consider them as naturally agonistic.

CONCLUSION

While anxiety can inhibit sexual responses, plethysmographic studies have shown that this is not always the case. According to the circumstances, anxiety sometimes hinders arousal and sometimes facilitates it. The anxiety-arousal relationship turns out to be more complex than Wolpe (1958), Masters & Johnson (1970) and Kaplan (1974) originally imagined; they considered these states as incompatible.

Finally, the decisive factor of sexual inhibition would appear to be cognitive interference, distraction. It is only when anxiety causes a distraction from erotic stimuli that it may be considered responsible for sexual inhibition. This is not the case for everybody; some people are more prone than others and this tendency seems to be a characteristic of people with a history of non-organic sexual dysfunction. Otherwise, anxiety does not have an impact on levels of arousal; in fact, it improves it.

The results from studies using the plethysmographic tests seem to be linked to studies carried out in related domains. Subject to empirical confirmation, we can therefore suggest the following cognitive theory concerning the relations between anxiety and arousal: sexual arousal can be regarded as a complex response that requires the convergent interpretation of internal and external stimuli. Anxiety may have different effects on this process, sometimes neutral, sometimes facilitating and sometimes inhibitory.

On the one hand, anxiety can trigger a vegetative emotional reaction that may be associated to a concomitant erotic stimulation. Thus, anxiety facilitates the sexual response: this can be called a *priming effect*. This effect is regularly observed in labs, mainly among women. It likely also works in certain compulsive sexual behaviours or, more commonly, in those numerous persons that report being sexually aroused when stressed.

On the other hand, anxiety can cause a massive irruption of non erotic cues in working memory. Therefore, cognitive function available for treating erotic stimuli is diminished and sexual response is impaired. This is an effect of *cognitive interference*. A trait called *erotophobia* could be regarded as a vulnerability factor to cognitive interference. Erotophobic subjects are characterized by a trend to focus upon danger-related information when they are in a sexual situation and by a higher risk of sexual dysfunction.

Finally, anxiety often increases vigilance. The increase in attention thus obtained may focus on erotic stimuli, therefore reinforcing the priming effect. At the opposite end of the scale, the gain in attention may also be dedicated to danger signals of no erotic value; under these conditions, it is the interference effect which is reinforced.

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