

SEXUAL PSYCHOPHYSIOLOGY

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In this article research on sexual psychophysiology in The Netherlands is reviewed. Research is conducted in three centers (Amsterdam, Rotterdam and Groningen). The research is concerned with three main areas in sexual psychophysiology, i.e. the identification of sexual stimuli, determinants of sexual arousal and applications of sexual psychophysiology in sexual medicine. It is concluded that, although sexual psychophysiology has a relatively short tradition in The Netherlands, people in the field are quite active and research is rapidly expanding.

At present there are three centers in The Netherlands where psychophysiological research on sexual arousal is being done. These centers are located in the Department of Psychology of the University of Amsterdam and in the Medical Faculties of the Erasmus University of Rotterdam and the University of Groningen. These centers operate independently of each other. Each center has its own staff and its own funding. Research programs have been developed more or less independently. The staff of the three centers know each other rather well, and there is a frequent exchange of ideas and research findings.

The purpose of this article is to present an overview of psychophysiological research on sexual arousal in The Netherlands. Only research using non-invasive recording techniques is covered in this article. Prior to the overview proper the international context of the research is briefly described.

International context

Psychophysiological research on sexual arousal can be grouped into three main categories: (i) research which aims at the identification of sexual stimuli and responses; (ii) research on the psychological mechanisms or processes which determine the occurrence of sexual arousal; and (iii) research on applications of sexual psychophysiology. Of course there is a fourth area of research which is very important, i.e. the development of instruments to assess physiological or psychological responses associated with sexual arousal. In this article we will focus on the results of research, taking the recording techniques for granted.

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Identification of sexual stimuli and responses

Masters and Johnson (1966) have clearly described the genital and extragenital responses which occur during sexual arousal. In addition they have described which kinds of physical stimulation evokes these responses. In an excellent review Rosen and Beck (1988) have documented the important contribution of Masters and Johnson to the field of psychophysiology. At the same time, Rosen and Beck have criticized them because they have largely failed to describe psychological stimuli and responses. In subsequent psychophysiological research, psychological stimulation and, to a lesser extent, the subjective experience of sexual arousal have been described (Rosen and Beck, 1988).

Despite significant progress, it seems that more refined identification of sexual stimuli and responses – of both somatic and psychological nature – is needed, because the present understanding of these stimuli and responses still is rather crude.

Psychological determinants of sexual arousal

This is a relatively neglected area of research. One explanation for this neglect is that researchers (and other people as well) have tended to rely on the concept of 'sexual drive' or 'libido' to explain the occurrence of sexual behaviour and arousal. It is thought that some kind of force pushes men and women towards sexual behaviour and arousal. Although this force has never been identified, the effect of psychological processes on sexual arousal has been obscured as a result of this conceptualization. For this reason Dekker and Everaerd (1989) have suggested to dismiss the concept of sexual drive as an explanatory construct. Instead they prefer a more neutral term such as 'determinants of sexual arousal', which refers to the interaction of biological and psychological processes which determine the occurrence of sexual arousal.

In their review Dekker and Everaerd (1989) identified the following psychological processes and mechanisms: (i) classical conditioning of sexual arousal to neutral stimuli; (ii) operant conditioning of sexual arousal as a function of instrumental contingencies; (iii) voluntary elicitation of sexual arousal by means of sexual imagery and voluntary inhibition of sexual arousal; (iv) complex effects of anxiety and cognitive distraction on sexual arousal; (v) a facilitating effect on sexual arousal of perceived control over the sexual interaction (dominance); (vi) the absence of an effect on sexual arousal of romantic love and probably also of aggression. It was concluded, however, that knowledge of psychological determinants of sexual arousal is only beginning to accumulate. Further research, which should be guided by theory, is urgently needed in this area.

Applications of sexual psychophysiology

In quite a number of fields sexual psychophysiology has been applied to practical problems. Rosen and Beck (1988) identified the following fields: (i) effects of erotica and pornography; (ii) assessment and treatment of paraphilias; (iii) male and female sexual dysfunction; (iv) alcohol and other drug effects on sexual arousal. To this list should be added (v) assessment and treatment of sexual problems in somatically ill patients.

Just like other research, sexual psychophysiology should ultimately contribute to the solution of human problems. It is therefore encouraging that applications have been sought in many different fields. At the same time it should be acknowledged that the actual solution of practical problems frequently requires an extended body of knowledge. Because sexual psychophysiology still is in its infancy, the expectations of applications should not be too high at this stage.

Research in The Netherlands

Research in sexual psychophysiology in The Netherlands started in Utrecht, where Dekker and Everaerd studied the effect of sexual imagery on sexual arousal (Dekker, 1988; Dekker and Everaerd, 1988, 1989, 1990; Dekker et al., 1985). Their research was concerned with two main questions. First, what kind of imagery (cognitive processing) leads to sexual arousal? Based on Lang's theory (1984) on emotive imagery, it was hypothesized that imagery leads to sexual arousal only if the subject imagines sexual responses (i.e. if the subject imagines subjective arousal and somatic responses). In support of this hypothesis it was shown that subjects who imagined sexual stimuli only became less aroused sexually than subjects who imagined sexual stimuli and sexual responses. The second main research question was: is the elicitation of sexual arousal by means of imagery a learnt phenomenon? In the laboratory, subjects were taught how to arouse themselves by means of sexual imagery, but no effect of this teaching could be demonstrated. Neither was the sexual history of the subjects substantially correlated with their ability to elicit sexual arousal by means of imagery. In Utrecht sexual psychophysiology has terminated because both Dekker and Everaerd left. Everaerd continued his work in sexual psychophysiology in Amsterdam and Dekker dedicated his attention to another field of research. At present, psychophysiological research on sexual arousal is done in Amsterdam, Rotterdam and Groningen. This research will be reviewed below.

Amsterdam

Two studies have been conducted so far focusing on *the identification of sexual stimuli*, although both studies touch upon *determinants of sexual arousal* as well. The first study (Laan et al., submitted for publication) was designed to identify whether erotic films made by women are more arousing for females than erotic films made by men. The so-called 'woman-made' films are female-initiated; the actors have equal roles as far as sexual desire and sexual pleasure are concerned and prolonged foreplay (stroking and kissing) is an important ingredient. Contrary to expectation, genital arousal was not significantly different between films. However, subjects did react more positive to the 'woman-made' film than to the 'man-made' film. The 'man-made' film evoked more feelings of shame, guilt and aversion. Evidently, these differences in subjective responses cannot be attributed to feedback from genital arousal. It seems more likely that subjective report is determined by the stimulus situation and stimulus content. The second study (Laan et al., 1990) was designed to

select stimulus materials which would elicit substantial genital as well as subjective sexual arousal. In the first part of the selection experiment subjects were to rate erotic film excerpts differing in sexual content, according to their own sexual preferences. In the second part of the experiment the three excerpts which were rated as 'most arousing' were shown to male and female subjects. Genital responses of both male and female subjects were small and did not differentiate between film excerpts. Women's responses showed a film presentation effect, indicating that the last excerpt evoked significantly higher responses than the excerpts shown earlier, regardless of content. This study shows that selection of stimulus materials should go beyond a mere selection according to subjective preferences.

At present, a number of studies on *determinants of sexual arousal* are being conducted. There is ample evidence of discordance and desynchrony when subjective sexual experience and physiological responses (vasocongestion) are recorded concurrently. While it is generally assumed that physiological and subjective indices of sexual arousal interact, it is still unclear whether subjective experience of sexual excitement is determined by peripheral feedback from genital arousal (bottom-up process) or whether genital arousal is controlled by cognitive processes (top-down process). In order to study this discordance in more detail, a habituation paradigm is being used in which discordance between subjective and physiological arousal may be expected over time. In a first study, the O'Donohue and Geer study (1985) was replicated with female subjects (Laan, in preparation). As opposed to the findings of O'Donohue and Geer with male subjects, in this study slides did not elicit substantial genital and subjective arousal in the female subjects, and habituation could therefore not be induced. The study will be repeated using erotic film excerpts (c.f. Meuwissen & Over, 1990). The discordance issue is also approached in a collaborative study* in which testosterone is administered to two groups of women who have testosterone deficiency. It is hypothesized that the physiological response system will recover faster than subjective experience of sexual arousal and sexual motivation.

In Amsterdam one study is concerned with *applications of sexual psychophysiology*. A psychophysiological diagnostic procedure to assess the influence of psychological factors on erectile difficulties has been developed. This procedure has been designed to elicit a maximum erectile response with psychological means. To investigate the possible inhibition of the sexual response by negative cognitive elaboration or cognitive interference, combinations of various stimuli and tasks (c.f. Barlow, 1986) are incorporated into a number of trials. Subjective sexual excitement and penile circumference are used as dependent variables. So far, it is clear that a combination of visual and tactile stimuli is most effective in eliciting a sexual response in patients with erectile disorders (Janssen et al., in preparation). To look a bit further into the role of conscious cognitive processing a study is being designed in which conscious processing will be prevented by means of a subliminal perception paradigm.

* This study is being conducted in collaboration with A. Tuiten, Department of Psychonomics, University of Utrecht, and H. Koppeschaar, Department of Endocrinology, Academic Hospital Utrecht.

Rotterdam

One study was concerned with *the identification of sexual stimuli* (Rowland & Slob, 1991). Sexually functional male subjects were presented with three stimuli: erotic video, vibrotactile stimulation and a combination of vibrotactile stimulation and erotic video. It was found that vibrotactile stimulation alone resulted in the smallest erection response, while this stimulation was perceived as somewhat unpleasant. However, vibrotactile stimulation in combination with erotic video resulted in a stronger erectile response than erotic video alone. This study demonstrates that there exists a complex interaction between the effect of somatic (vibrotactile) and psychological (video) stimuli.

Two studies are concerned with *determinants of sexual arousal*. In the first study (Rowland et al., 1991) the perceptual threshold of stimulation to the penis was studied. More specifically, changes in thresholds resulting from papaverine induced tumescence were determined in sexually functional and dysfunctional men. Perceptual thresholds increased with increases in tumescence. In other words: penile sensitivity decreases as tumescence increases. Dysfunctional men had higher thresholds than functional men. In the second study (Slob et al., 1991) the relationship between the menstrual cycle phase and sexual arousability of women was studied. Women were tested twice with erotic videos. Women tested for the first time in their follicular phase were sexually more aroused than women tested for the first time in their luteal phase. However, when the women were retested, the women who were then luteal scored as high again as when tested during their follicular phase. If this finding can be replicated, it indicates a complex interaction between menstrual cycle phase, the number of tests and sexual arousal.

Finally, two studies were concerned with *applications of sexual psychophysiology*. In one study (Slob et al., 1990a) convincing evidence of at least partial functional sexual potency was obtained in 71% of men who sought medical treatment for impotence: visual erotic stimuli caused an increase in penile circumference in these men. The authors concluded that erectile difficulties of these men were probably of psychosocial instead of somatic origin. In another study (Slob et al., 1990b) it was found that the sexual response to erotic video of women with diabetes mellitus (type I) was not significantly different from matched control subjects. The diabetic women had no serious neuropathy or angiopathy, which may explain the absence of a difference. At present Slob and his coworkers are doing a study on penile sensitivity in men with ejaculatory disorders (premature and retarded ejaculation).

Groningen

The research in Groningen is in the field of *identification of sexual stimuli*. Vaginal sensitivity was investigated in a group of 60 volunteers by means of an electric stimulus and under nonerotic conditions (Weijmar Schultz et al., 1989). In comparison with the dorsum of the hand, the genital area has a low sensitivity for electric stimuli. Of the genital area, the vaginal wall measured 2 to 4 cm from the vaginal introitus was found to be very insensitive. Within the vaginal wall a relatively sensitive position to electric stimuli could be detected at the "12hr position" (the anterior vaginal wall).

The study provides data underscoring previous anatomical and clinical research findings regarding the sensitivity of the anterior vaginal wall. These results indicate that overall the vagina is relatively insensitive to stimulation. In addition to this study, studies have been done on sexual arousal of somatically-ill patients. This research is reported elsewhere in this volume.

Discussion

In this article research on sexual psychophysiology in The Netherlands has been reviewed. Presently, research is conducted in three centers, located in Amsterdam, Rotterdam and Groningen. The research in these centers is concerned with three main areas in sexual psychophysiology, i.e. the identification of sexual stimuli, determinants of sexual arousal and applications of psychophysiology in medical sexology.

With regard to the identification of sexual stimuli, studies have been done on vibratory-tactile stimulation, on subjective ratings of the erotic value of stimuli in relation to genital responses, and on the effect of 'man-made' versus 'woman-made' erotic film excerpts on subjective sexual experience and physiological arousal. In describing the international context of this research it was concluded that more refined identification of both somatic and psychological stimuli is needed. The Dutch studies seem to contribute in this respect. Regarding determinants of sexual arousal the role of sexual imagery has been studied. In addition the concordance/discordance of subjective and genital arousal is being studied by means of a habituation paradigm. Finally, hormonal influences on sexual arousal are being studied. It seems that the number of studies on determinants of sexual arousal is increasing. This may contribute to the understanding of factors which determine sexual arousal. On the international level, sexual psychophysiology has been applied in six main areas. Research in The Netherlands focusses on two of these areas, i.e. sexual dysfunctions and sexual functioning in somatically-ill patients. The overall conclusion of this overview seems to be that, although sexual psychophysiology has a relatively short tradition in The Netherlands, the research groups are quite active and rapidly developing.

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