

ANXIETY/DISCOMFORT AND HANDWASHING IN OBSESSIVE-COMPULSIVE AND PSYCHIATRIC CONTROL PATIENTS

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Summary—The effects of touching a feared dirt stimulus and handwashing on subjective anxiety/distress and autonomic reactivity were investigated in 6 patients with fear of contamination and handwashing behavior and 12 psychiatric control patients.

An increase in autonomic anxiety/discomfort was found during anticipation and the actual touching of a dirt stimulus of moderate intensity in both groups.

Handwashing after touching the dirt stimulus only resulted in a reduction of subjective distress in both the experimental and control group.

The anxiety/discomfort reduction theory plays a dominant role in the explanation and treatment of obsessive-compulsive disorders (e.g. Wolpe, 1958; Metzner, 1963, and Mather, 1970). It has been argued that this theory cannot explain all aspects and forms of obsessive-compulsive behavior (Walker and Beech, 1969; Marks *et al.*, 1969; Beech and Liddell, 1974). Hodgson and Rachman (1972) however found support for the theory in a study on the effect of contamination and washing on subjective anxiety/discomfort ratings in obsessional patients. According to them the anxiety/discomfort reduction theory seems to give the best explanation of the type of patient with fear of contamination and ritualistic handwashing. Subtypes of obsessive-compulsive behavior were revealed by factor analytic studies of self-report data of patients suffering from this disorder. A study of Kraaimaat and van Dam-Baggen (1976) yielded four subtypes of behavior: difficulties with regard to the structuring of activities, checking and repetition, unpleasant and irrational thoughts, fear of contamination. Similarly Hodgson and Rachman (1977) established: checking, cleaning, slowness and doubting. It seems advisable to leave the molar concept of obsessive-compulsive behavior and to use molecular types of behavior. Support for the anxiety/discomfort reduction theory has only been found by subjective reports of distress for the type of fear of contamination followed by washing behavior. Confirmation of the Hodgson and Rachman results is needed with regard to indices of autonomic reactivity. Handwashing behavior after contamination is named 'ritualistic', although duration and specific features of handwashing have not been differentiated from handwashing behavior without contamination (neutral handwashing). In the present study effects of anticipation and the actual act of touching a feared dirt stimulus and handwashing on subjective anxiety/distress and autonomic reactivity were investigated in a group of patients with fear of contamination and handwashing behavior and a control group of psychiatric patients. Neutral handwashing and handwashing behavior after touching the dirt stimulus were explored in both groups. For both groups of patients we predicted that:

1. Anticipation and the actual touching of a feared dirt stimulus produce an increase in heart rate/min, skin conductance level and spontaneous fluctuations/min.
2. Handwashing behavior after touching the feared dirt stimulus produces a reduction in subjective anxiety/discomfort and a reduction in heart rate/min.
3. Touching a feared dirt stimulus produces longer handwashing behavior than neutral handwashing.

The following group differences were predicted:

4. Obsessive patients indicate more subjective distress and avoidance tendency on a self report inventory of dirt stimuli than psychiatric patients not afflicted by this disorder.

Group differences were explored regarding:

1. Extent of anxiety/discomfort during the anticipation period and after touching the feared stimulus and extent of anxiety/discomfort reduction during handwashing.
2. Duration of handwashing behavior, and frequency of specific handwashing behavior.

METHOD

Subjects

The experimental group consisted of six obsessive-compulsive patients with fear of contamination and handwashing rituals (5 females, 1 male), ranging in age from 21 to 51 (mean 38.8 yr). The average duration of the disorder was 14 yr (2½–40 yr). The obsessional complaints of the patients were medium to very serious.

The control group was composed of 12 psychiatric in-patients (7 females, 5 males) not suffering from obsessional disorders. This group ranged in age from 26 to 50 (mean 34.0 yr), with an average duration of the complaints of 7 yr (1–14 yr).

Measurement

The following variables were measured:

Subjective report. Before the subjects participated in the experiment they completed a number of questionnaires:

Inventory of obsessive-compulsive behavior (Kraaimaat and van Dam-Baggen, 1976), Inventory of subjective distress and avoidance of dirt stimuli, consisting of 46 items and constructed for the experiment, Fear Survey Schedule III (Wolpe and Lang, 1964).

During the experiment subjects rated their anxiety/discomfort on a five point distress scale.

Autonomic activity

Autonomic activity was operationalized by means of heart rate/min, skin conductance level and skin conductance spontaneous fluctuations/min.

Heart rate. Two electrodes (Zenco E.K.G., Mono Disc. Z-1145) were placed on the chest of the subjects and were connected to a transmitter (Narco-Bio Systems E.C.G., F.M.-1100-E2). The transmitter signal was received by a tuner (Kenwood type KT-8005) and sent to an amplifier (Hapé) for auditive feedback, to an oscilloscope (Sony Textronix type 323) for visual feedback and to a registration apparatus (Physioscript type PEE 2 and preamplifier type WF 561, Fritz Schwarzer, GMBH).

Skin conductance. Two silver-silver-chloride electrodes were connected via a skin conductance apparatus to a Kipp Two Channel Flatbed Recorder (type BD 9-725 E). Both the Schwarzer and the Kipp recorders were connected to a pulsegenerator (Delta Electronica, Power Supply E 030-1) for time indication (in seconds). A spontaneous fluctuation was defined as an increase of at least 2 μ mho within a period of 4 sec.

Overt behavior

Handwashing behavior was recorded by means of Sony video equipment.

Stimulus material

Before each subject participated in the experiment a hierarchy of 'dirty' objects was constructed with the help of a sud-scale (range 0–100). A dirty object with sud-scale values between 40 and 60 was selected as experimental stimulus.

Procedure

A one-way screen connected the experimental room with the observation room, in which the registration apparatus were situated. A corridor connected the experimental room with the kitchen where handwashing took place. The experiment consisted of five phases: introduction, handwashing I, relaxation, presentation of the experimental stimulus and handwashing II.

Introduction. The experimenter showed the subject the experimental room, the observation room and the kitchen. The purpose of the investigation was explained and heart electrodes were attached to the person. Subjects were instructed in scoring the five point subjective distress scale.

Handwashing I: Subjects were asked to wash their hands in the kitchen in order to make proper attachment of skin conductance electrodes possible. Heart rate and handwashing behavior were registered. No time limits were set to the subjects.

Relaxation: Skin conductance electrodes were connected to the fingers of the non-dominant hand. The relaxation procedure was performed by means of the Wolpe and Lazarus relaxation instructions. Relaxation was included in order to induce a rest condition for assessment of the basic level of autonomic activity and subjective distress. During the 10 min relaxation period skin conductance and heart rate were measured continuously. At the end of this period subjects rated their subjective distress.

Presentation of the experimental stimulus

In the anticipation period the stimulus to be touched was shown to the subject. The subject was asked to estimate the level of subjective distress that would be experienced by touching the dirt stimulus. The subject was then requested to touch the stimulus. After touching, the skin conductance electrodes were removed.

Handwashing II. Instructions for handwashing were given. Heart rate and handwashing behavior were recorded. At the end of this period the subject was asked to indicate his level of subjective distress at the start and end of the handwashing. No time limits were set to the subjects.

A schematic representation of the five phases of the procedure is given in Fig. 1.

RESULTS

Data were tested by means of the following nonparametric tests: within group differences by signed-ranks test Wilcoxon matched-pairs and between group differences by Mann-Whitney *U* test (Siegel, 1956).

No differences were found between experimental and control group on FSS III and age. Groups differed on the inventory of obsessive-compulsive behavior ($p < 0.001$),

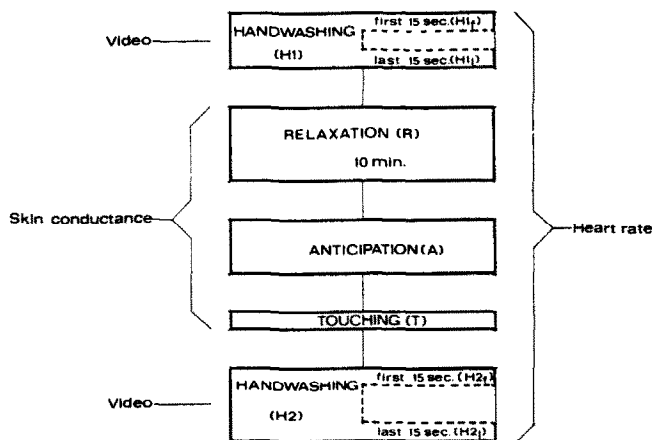


Fig. 1. Experimental phases and registration.

Table 1. *p* values of within group differences between anticipation and touching with the rest condition

	Experimental group	Control group
1. Anticipation of touching the dirt stimulus vs relaxation		
a. Heart rate/min	0.025	n.s.
b. Skin conductance level	0.025	0.01
c. Skin conductance fluctuations	0.025	0.005
d. Subjective distress	0.05	0.05
2. Touching the dirt stimulus vs relaxation		
a. Heart rate/min	n.s.	n.s.
b. Skin conductance level	0.05	0.025
c. Skin conductance fluctuations	0.025	0.01
3. Subjective distress at the start of handwashing (II) vs relaxation	0.05	n.s.

and total scores on the inventory of subjective distress of dirt stimuli ($p < 0.01$). Composition of experimental and control group appeared to be in accordance with the purpose of the investigation.

Hypothesis 1

The tested differences in anxiety/discomfort reaction regarding anticipation and the actual touching of the experimental stimulus compared with the relaxation period are presented in Table 1. The means for heart rate/min, skin conductance level, skin conductance fluctuations and subjective distress for each phase, are shown in Fig. 2.

Hypothesis 2

No differences were found between the first and last 15 sec of the handwashing period after contamination in experimental and control group in heart rate/min. A decrease

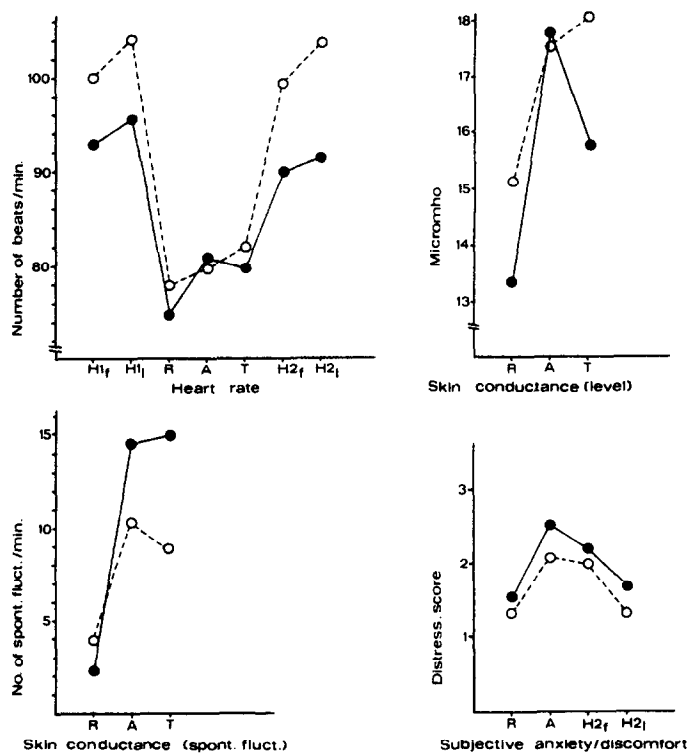


Fig. 2. Means of heart rate/min, skin conductance level, skin conductance fluctuations and subjective distress for each phase. The continuous line represents the experimental group. The broken line represents the control group.

Table 2. Median frequencies of specific features of handwashing behavior and *p* values of within and between group differences

	Median frequencies				<i>p</i> values			
	Experimental group		Control group		H1 vs H2		Differences between groups	
	H1	H2	H1	H2	Exp. group	Control group	H1	H2
Rubbing	3	4	2	2	*	*	n.s.	0.05
Wringing hands	2	1	2.5	1	*	0.05	n.s.	n.s.
Wringing fingers	0	2	1	0.5	*	n.s.	n.s.	0.05
Total rubbing and Wringing	5	7	6	3.5	*	0.01	n.s.	0.05
Rinsing	2	4	2	1	n.s.	n.s.	n.s.	0.05
Shaking	1	0.5	1	1	n.s.	n.s.	*	*
Taking soap	1.5	2	1	1	n.s.	n.s.	*	*
Total movements	7	10.5	8	6	n.s.	0.05	n.s.	n.s.
Duration in seconds	34.5	43	32.5	24	n.s.	n.s.	n.s.	n.s.

* Not testable because of small number of subjects.

in subjective distress was found between the start and end of the handwashing period after contamination in both groups ($p < 0.05$).

Hypothesis 3

No differences were found between handwashing I and handwashing II in duration in experimental and control group.

Hypothesis 4

The experimental group reported more subjective distress on the 46 items dirt inventory than the control group ($p < 0.01$). No differences between groups were found in reported avoidance tendency on the dirt stimuli.

In addition, the experimental group reacted more strongly than the control group during anticipation and the actual touching of the experimental stimulus on skin conductance fluctuations (resp. $p < 0.025$ and $p < 0.01$). No differences between the groups were found regarding heart rate/min and skin conductance level. No differences between the groups were found with regard to reduction of heart rate/min and subjective distress during handwashing after touching the feared stimulus. In Table 2, an analysis of specific features during neutral handwashing (H1) and handwashing after contamination (H2) for both groups is presented.

DISCUSSION

Anticipation and the actual touching of a dirt stimulus of moderate intensity resulted in an increase of autonomic anxiety/discomfort in obsessive-compulsive patients with fear of contamination, as well as in psychiatric control patients. Compared with skin conductance level and fluctuations, heart rate/min appeared to be a less sensitive indicator of autonomic reactivity. In a similar experiment, Hodgson and Rachman (1972) found no support for an increase in heart rate/min. These findings show the importance of using various physiological parameters of anxiety/discomfort, which is in accordance with the frequently reported independence of autonomic indices (Lang, 1971). Anticipation of the dirt stimulus resulted in an increase of subjective distress in experimental and control patients. Actual touching of a dirt stimulus resulted only in an increase of subjective distress in the obsessive-compulsive patients. The last finding may be due to the fact that subjective distress during touching the dirt stimulus was determined at the start of handwashing after contamination. The handwashing instructions could have an anxiety reducing effect for experimental and control patients. Handwashing after touching a feared dirt stimulus resulted in a reduction of subjective distress in both the experimental and control group. As far as the physiological measures are concerned no reduction was found in heart rate/min during handwashing. Unfortunately

no data were available on skin conductance during handwashing, because electrode attachment was not possible during this condition. With the exception of heart rate/min these data support the anxiety-reduction hypothesis concerning patients with fear of contamination and handwashing 'rituals' and psychiatric control patients.

On the other hand no differences were found between and within groups in duration of neutral handwashing and handwashing after contamination. In an interview held after the experiment the experimental subjects indicated that they would have washed longer in similar conditions of contamination at home. It might be possible that as a result of video registration more social control was experienced by the experimental subjects during handwashing after contamination. An analysis of frequency of features of handwashing behavior without contamination and after touching a dirt stimulus of moderate intensity yielded only tentative evidence. Control patients showed a tendency to wash hands less extensively after touching the dirt stimulus as compared to neutral handwashing. Experimental subjects showed a tendency to wash hands more extensively after contamination. After touching the dirt stimulus the experimental subjects exhibited more total rubbing and wringing movements than the control patients. Further exploration of handwashing characteristics is needed with a greater number of patients and in an experimental situation where social control as a result of video registration is less influential. The experimental subjects reported more subjective distress on a 46-item dirt inventory than the control subjects. No differences concerning the inventory were found between groups on reported avoidance tendency. The higher sensitivity for dirt stimuli for the experimental subjects could have the effect of less successful avoidance in every-day situations.

Although the sud-scores for the presented dirt stimulus were the same for both groups, the experimental group showed more skin conductance fluctuations during anticipation and during the actual touching of the dirt stimulus. It might be possible that obsessive-compulsive patients generalize the contaminating effects of the dirt stimuli on a cognitive level.

The rather consistent results of the present study underline the idea of investigating molecular types of obsessive-compulsive behavior.

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