

The Study of Some Functional Relations Involved in the Obsessive-Compulsive Behaviors

O estudo de algumas relações funcionais envolvidas nos comportamentos obsessivo-compulsivos

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ABSTRACT

Specialized literature establishes that obsessive-compulsive responses may be reinforced by elimination of conditioned aversive stimuli and anxiety, by social attention, and by avoidance of aversive situations. The present study intends to test that hypothesis through analysis of single cases. **Method:** After interviews and a preference test, three children with washing compulsion were submitted to twelve sessions of 15 minutes each, conducted in a room with a washbasin and other matters that might be used in the activities and in ritual's performance. Each child was submitted to the following conditions: toys of medium preference; toys of medium preference and dirt; toys of low preference; toys of low preference and dirt; toys of high preference; toys of high preference and dirt; aversive tasks; aversive tasks and dirt. Sessions were videotaped and duration of each behavior was registered. **Results:** Results show a relationship between these behaviors and the experimental conditions. Subject 1, for instance, presented more duration of obsessive-compulsive behavior and had a higher duration at the aversive task condition and at the toys of low preference conditions, confirming the hypothesis of literature that suggests the multiple operant function of obsessive-compulsive behavior.

Key Words: obsessive-compulsive behavior, obsessive-compulsive disorder, functional analysis, behavioral assessment.

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RESUMO

*A literatura especializada propõe que comportamentos obsessivo-compulsivos possam ser mantidos pela eliminação do estímulo aversivo condicionado e da ansiedade, por reforçamento meio de social e por esquiva de contingências aversivas. Apresenta-se como objetivo verificar essas hipóteses a partir do estudo de casos únicos. **Método:** Três crianças, que apresentavam rituais de limpeza, participaram de 12 sessões de 15 minutos cada, em sala contendo pia com água corrente e materiais que possibilitassem atividades e rituais. Após entrevistas e um teste para avaliar preferência por diversos brinquedos, cada criança foi submetida a diferentes condições experimentais, envolvendo: brinquedos de média preferência; brinquedos de média preferência e sujeira; brinquedos de baixa preferência; brinquedos de baixa preferência e sujeira; brinquedos de alta preferência; brinquedos de alta preferência e sujeira; tarefas aversivas; tarefas aversivas e sujeira. Sessões foram gravadas em vídeo e os comportamentos foram registrados e analisados. **Resultados:** Os resultados mostram alguma relação entre comportamentos observados e condições experimentais, como o sujeito 1, que apresentou maior duração dos comportamentos destacados nas sessões com sujeira e brinquedos de baixa preferência e atividades aversivas, convergindo com a literatura que aponta as várias funções operantes dos comportamentos obsessivo-compulsivos.*

Palavras-chave: comportamentos obsessivo-compulsivos, transtorno obsessivo-compulsivo, análise funcional.

The analysis of the behaviors that make up the so-called psychiatric problem must be carried out by the behavior analyst and be derived from the following assumptions: 1) the model of selection by consequences, which ascertains the importance of the analysis on the reinforcing functions of behaviors; 2) the externalism (the search for external variables that may affect behavior) and; 3) the idiosyncrasy of the behavior as an outcome of manifold reinforcement histories (Cavalcante, 1999).

According to the DSM-IV (American Psychiatric Association - APA, 1995) and CID-10 (World Health Organization - WHO, 1993), the obsessive-compulsive disorder (OCD) is characterized by ob-

sessions (intrusive and recurrent thoughts, ideas or images evoking severe anxiety and distress) and by compulsions (rituals): overt or covert actions which are repetitious, stereotyped, and aimed at getting rid of the obsessions and distress. It is noted that in those manuals and in part of the literature on psychiatric disorders as well (e.g.: Kaplan & Sadock, 1999; Neziroglu & Hsia, 1998; Salkovskis & Kirk, 1997), that the most common explanation for the onset of the obsessive-compulsive behaviors is related to the pairing up of a neutral stimulus and an aversive experience, and to some operant functions such as the elimination of symptoms. As in regards to the maintenance of the obsessive-compulsive behaviors within the behavioral repertoire of the individual,

the literature above mentioned generally proposes the model of operant conditioning, in which the performance of some responses (rituals) is reinforced by the non-rise of the dreaded situations and by the elimination of the intense distress (Banaco, 1997).

Some authors such as Banaco (1997), Banaco & Zamignani (2004), Graña & Bayon (2000), Guedes (1997), Queiroz, Motta, Madi, Sossai, & Boren (1981), Vermes (2000), Vermes & Zamignani (2003) and Zamignani (2000) pointed out the need for an investigation on the possible variables from the outside environment that might be related to the obsessive-compulsive behaviors, as they deem the traditional explanation insufficient. Theoretically the rituals might be reinforced by relations other than those directly linked to the elimination of obsessions and compulsions.

Some authors have suggested that the obsessive-compulsive behaviors might be partially maintained by positive reinforcement, especially as a form of social attention (Banaco, 1997; Graña & Bayon, 2000; Guedes, 1997; Queiroz *et al*, 1981; Regra, 2002; Rowan, Holborn Walker & Siddiqui, 1984; Vermes & Zamignani, 2003; Zamignani, 2000); as, for example, the presence of a mother close to a child with an obsessive doubt (Regra, 2002); compliments from the boss contingent on the fulfillment of a perfect task which involved checking rituals (Zamignani, 2000); the mother's lap, contingent on the performance of rituals (Zamignani, 2000); the participation of family members in the carrying out of the rituals (Calvocoressi, Lewis, Harris, Trufan, Goodman, McDuogle, & Price, 1995; Guedes, 1997; Pollock & Carter, 1999; Rowan *et al*, 1984; Shafran, Ralph & Tallis, 1995); and even the scolding contingent on the performance of rituals (Regra, 2002).

Literature also points out that such behaviors might be a set of complex avoidance responses, which are operant behaviors typical of aversive contingencies. Anxiety seems to be a sub-product resulting from aversive contingencies, which include signaled and unsignaled aversive situations (Sidman, 1995), and which falls upon a behavior kept under operant reinforcement. Banaco (1997), Regra (2002), Vermes & Zamignani (2003) and Zamignani (2000) pointed out that obsessive-compulsive behaviors have often been seen as ways by which an individual has learned to walk away from aversive conditions.

Although literature acknowledges the importance of the functional identification of the problems brought to the clinic, there has been little advancement in terms of providing instruments to fulfill such objective (Hayes, Wilson, Gifford, Follette & Strosahl, 1996; Meyer, 1997).

Based on what has been exposed so far, this work concerns mostly with the development of a proposal of analysis on conditions that are likely to enhance the likelihood of obsessive-compulsive behaviors, taking into account the problems and questions raised by literature on them in relation to the possible contingencies set up by the outside environment. In the light of the behavior analysis, this research aims at identifying, in unique cases, the effect of the introduction of activities at different levels of preference and of aversive stimuli on the occurrence and length of cleaning rituals.

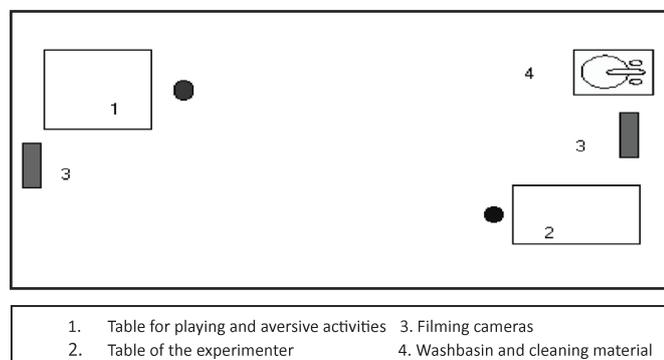
METHOD

The present study was started just after Ethic Committee's approval

Table 1: Description of the participant subjects

Subject	Sex	Age	Obsessions	Rituals	Anxiogenic stimuli	Aversive Activities	Treatment parallel to the study
1	M	9 y. 5 mo.	Contamination; need to lick others or himself	Washing hands; licking himself and others; collectionism.	Feces and viscous substances	Mathematics tasks	Psychiatric medication
2	M	9 y. 5 mo.	Contamination; blasphemy	Washing hands; avoiding contact with floor; praying repeatedly	Non- specified	Mathematics, Geography, and reading comprehension tasks.	ERP
3	F	10 y.	Contamination	Washing hands, washing objects.	Feces	Mathematics and Portuguese tasks	Psychiatric medication

Fig. 1: Representation of the room where the experimental sessions took place.



SUBJECTS

Three children presenting obsessive-compulsive behaviors, mainly of cleaning/washing rituals. The selection of subjects was upon referral by a hospital staff who had carried out psychiatric interviews and evaluation by the YBOCS (Yale Brown Obsessive Compulsive Scale). These children were already under treatment (drug therapy or technique of exposure response prevention - ERP) for OCD.

The characterization of each subject is presented in Table 1.

PHYSICAL ENVIRONMENT

For data collection, a room for child therapy at Ana Maria Poppovic Psychological Clinic at PUC- SP was used. In the room there was a washbasin with current water. Also, throughout all the data collection sessions, there was some cleaning material often used by the child (this information was gotten from the interviews done on the people responsible for the child), which enabled the performance of the cleaning/washing rituals. The disposition of the elements in the room is shown in Figure 1.

MATERIAL

To collect the data of all the subjects, we used a washbasin and running water with soap and cleaning material (disposable paper and cloth); two cameras and mini-VHS tapes for videotaping the

sessions; a VCR for playing the video recordings; a chronograph to keep track of the length of the sessions (during data collection) and for measuring the time span of the rituals and other behaviors (during the playing of the video recordings); and a microcomputer for organizing the data obtained from the video recordings.

We also used some other items which varied from subject to subject, according to the kind of ritual and preferences of each one. Those were objects thought to trigger the rituals, such as mild candy and chocolate (both are paste-consistency items); toys, school stuff, and/or daily activities the child tended to avoid.

PROCEDURE

1. Initial contact with the subjects and people responsible for them

Through an interview done with the subjects and their parents, we explained the objectives of the research, the rules, and conditions for participation. We also presented the terms of informed consent for the participation in research with humans, and collected the necessary approving signatures. The objectives of the research were presented to the subjects and their parents the following way: "This research serves as a way for me to find out what happens when you (or your child) are exposed to dirt, different kinds of toys and activities", aiming at exerting the least possible control over the behaviors of the subjects.

As a reward for participating in the research, we offered advising - derived from the data obtained - to the parents of the subjects, which would be done in 8 sessions under responsibility of the researcher.

2. Additional interviews on parents and subjects

Semi-open interviews were carried out on the children and their parents. They aimed at: 1) verifying the existence of washing rituals; 2) inquiring into what materials the child often used when performing the rituals, thus enabling the planning of the physical environment for data collection; 3) searching into the stimuli that often aroused the performance of rituals; 4) identifying the activities the child was prone to avoid.

3. Selection of the experimental items

a) Inquiry into possible reinforcers

A preference test was carried out to spot the possible reinforcing activities for each subject. In the test chosen, the stimuli (toys) were presented in pairs and in different pairings (Pace, Ivancic, Edwards, Iwata, & Page, 1985), but some modifications were done on it because the procedure by Pace *et al* (1985) was applied to children with development disorders.

For each subject, a set with 18 items was put up. The items were suitable for the age and gender, such as painting and drawing material, modeling clay, among others. The 18 items were randomly divided in three groups containing 6 items each. The 6 items of the first group were presented to the child in pairs; and the child was given the following instruction: "I am going to present two objects to you. You can play a little with both, with just one of them or with none". After a minute and a half, the pair of toys was taken away. Each toy of that group was presented pairing up with the others. This way, all six toys were presented, in pairs, in all possible pairings. The same procedure and recording were carried out with the other sets of 6 items. Based on the

contact time of the child with each toy, we designed a preference ranking. The four toys which the child had more contact with (measured in time) were considered “high preference” ones. On the other hand, the four “low preference” toys were the ones with which the child had the least contact measured in terms of time. The ten remaining toys were classified as “medium preference” toys and the higher number of items in this category (higher in relation to the other two: high and low preference) is due to the fact that these toys would be used in a bigger number of sessions. Finally, the 18 items were divided in groups labeled as “items of high preference”, “items of medium preference”, and “items of low preference”.

b) Selection of the hypothetically anxiogenic items

The identification of the anxiogenic stimuli was done through the interviews on the children and their parents. Table 1 shows such stimuli for each subject. Substances that looked like the anxiogenic stimuli were used. Chocolate in pasty-consistency was used as an anxiogenic stimulus for subject 2. Feces, which were anxiogenic stimuli for subjects 1 and 3, are hardly used, especially because they can in fact harm the child by contamination, and also because children are not expected to be directly in contact with them in their daily activities. Because of that, it was decided to introduce attenuated stimuli which physical properties similar to those of the anxiogenic stimulus. We chose the pasty-consistency milk candy for subject 1 and pasty chocolate for subject 3.

4) Experimental sessions

As shown in Figure 2 below, twelve 15-minute sessions were carried out for each subject. All of them went to the clinic for four days. Three experimental

sessions were done each day the child showed up. The proposal for the study prescribed that for all subjects there should be a week interval between each collection day. However, due to a holiday, for subject 2 there was a 10-day break between collection day 3 and collection day 4. The time interval between each one of the three sessions done on a single day was approximately 3 minutes, during which the experimenter set up a new experimental condition while the child waited outside the room.

At the beginning of each session, the following instruction was delivered to the subjects: “Here are the toys you can use now. You can do anything in this room, except for playing around on the cameras. I will be working at the other table. Try to speak to me only if it is really necessary”. In sessions when tasks were assigned, the instruction was the following: “I need you to do these activities. I will be working at the other table. Try to speak to me only if it is really necessary”. The experimenter stayed in the collection room during the sessions doing some reading with the back turned to the child.

It is worth saying that the anxiogenic stimulus (dirt) was applied on the table and on the toys the child would have access to in the session. For all the subjects, in all sessions involving such stimulus, the same amount of material chosen was used for each subject: a spoonful of pasty-consistency chocolate or milk candy.

As the objective was to control the effect of the experimental history on the behavior of the subjects during the sessions, the order of the experimental conditions was different for each one of them. It is necessary to highlight that the condition in which there were toys identified as “medium preference”

ones, without the anxiogenic stimulus (dirt) being present, was defined as the “baseline” condition. Below is the organization of the sessions for each child:

5) Recording and organization of the collected data

The experimental sessions were videotaped; and in relation to the time spent on the behaviors, they

were recorded as follows: **1) playing; 2) performing aversive tasks, 3) washing hands; 4) wiping hands (without using the washbasin); 5) cleaning the items around the data collection room; 6) standing still¹** (according to Catania, 1999, the passive avoidance, that is, not responding, has been seen as the product of aversive contingencies, once the individual would avoid passively the contact

Figure 2: Description of the experimental sessions for the three subjects

SUBJECT 1												
COLLECTION DAYS	1			2			3			4		
SESSIONS	1	2	3	4	5	6	7	8	9	10	11	12
PHASES	BL1	MP1	BL2	HP1	HP2	BL3	AT1	AT2	BL4	LP1	LP2	BL5
ANXIOGENIC STIMULI	X			X			X			X		
SUBJECT 2												
COLLECTION DAYS	1			2			3			4		
SESSIONS	1	2	3	4	5	6	7	8	9	10	11	12
PHASES	BL1	MP1	BL2	LP1	LP2	BL3	HP1	HP2	BL4	AT1	AT2	BL5
ANXIOGENIC STIMULI	X			X			X			X		
SUBJECT 3												
COLLECTION DAYS	1			2			3			4		
SESSIONS	1	2	3	4	5	6	7	8	9	10	11	12
PHASES	BL1	MP1	BL2	AT1	AT2	BL3	HP1	HP2	BL4	LP1	LP2	BL5
ANXIOGENIC STIMULI	X			X			X			X		

BL = Baseline
 AT = Aversive Task
 HP = High Preference
 MP = Medium Preference
 LP = Low Preference

¹ Some difficulties were found as regards the assessment of frequency and time spent on “standing still”. Those difficulties are presented and discussed in the “Discussion” section.

² It was decided to include the “nail-biting” behavior in the analysis as it is a typical response from anxiety and because it was presented by two subjects.

with the aversive stimulus. Also, Estes & Skinner, in 1941, and Sidman, in 1995, pointed that aversive situations might interrupt ongoing actions); 7) **biting nails**²; 8) it was observed that subject 1 presented the behavior of **licking hands**, which was also recorded because it performed as a behavior similar to the rituals described in the interview with his mother. The definitions used for recording such behaviors were as follows:

1. **Playing** – Keeping physical and/or visual contact with the toys.
2. **Performing aversive tasks** – Keeping physical and/or visual contact with some material when experimenter assigned to the subject a task previously described as aversive in the interview with the parents.
3. **Washing hands** – Keeping hands under the washbasin water with or without using soap or detergent.
4. **Wiping hands (without using the washbasin)** – Rubbing hands on a piece of cloth, paper towel, and on their own clothes.
5. **Cleaning the items around the data collection room** – scrubbing the table surfaces, toys, and objects used for performing the aversive tasks with cloth and/or paper towel.
6. **Standing still** – Having no physical and/or visual contact with any experimental item around the data collection room. In the sessions in which aversive activities were assigned, we considered as a “standing still” behavior the lack of physical or visual contact with the proposed material, unless after that time the children presented the required behavior (that is, to work their way through the proposed activities). That would show that, although there was no physical or visual contact with the material for some

time, the child had probably been thinking (covert response) so as to subsequently produce the overt response (writing).

7. **Biting nails** – holding nails between teeth.
8. **Licking hands** – touching hands with tongue and/or mouth, passing tongue over hands.

RESULTS

The results presented are related to the data of each subject, individually. In each experimental session, toys of high, medium or low preference, aversive tasks, and dirt could be present. For all subjects, sessions 1, 3, 6, 9, and 12 were named baselines (toys of medium preference without dirt). Observing the video recordings enabled the recording of the behaviors of playing, performing aversive tasks, and of behaviors possibly linked to the obsessive-compulsive problem and to anxiety.

Subject 1

At the very beginning of the first session (first contact with the subject with the data collection room), the washing-hands behavior was observed. Such behavior was presented for only 23 seconds, and only in this first session, which leads to the hypothesis that the exposure of the individual to an unknown environment might have been triggered such behavior.

In Figure 3, it is observed that the sessions when tasks were assigned (session 7); with task assignment and anxiogenic stimulus (session 8), and with medium preference toys (session 9, a baseline session following the sessions with aversive tasks) are the ones in which the noted behaviors lasted longer. In session 7, the child kept biting his nails for 79 seconds and licking his hands for 17

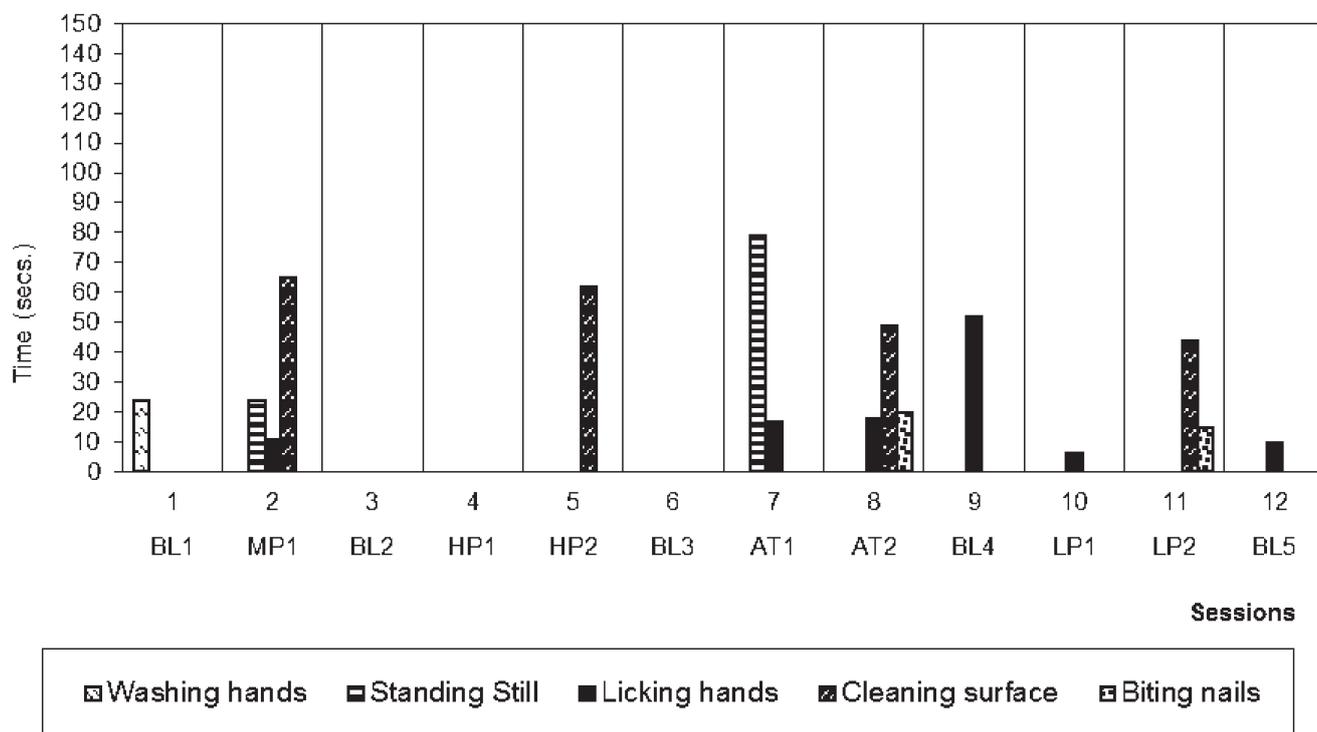


Fig. 3.: Obsessive-compulsive behaviors and behaviors related to anxiety in twelve sessions - Subject 1

seconds. In session 8, in which dirt was introduced, the subject remained for 18 seconds licking his hands, cleaning surfaces for 49 seconds, and also standing still for 20 seconds. It is necessary to stress the hand-licking behavior had nothing to do with the contact of the subject with the anxiogenic stimulus (milk candy), once it was not taken to the mouth by the child in any moment (had that happened, it might have been supposed that such stimulus played a reinforcing character to the subject).

Conversely, Figure 3 shows that, comparatively, the day on which the high preference items were presented (sessions in which items of high preference were presented – session 4 -, items of high preference with dirt – session 5 – and items of medium preference following the session having toys

of high preference – session 6), was the one when the subject displayed the least variety of behaviors linked to the obsessive-compulsive disorder. As regards the time span of the behaviors that might be related to the obsessive-compulsive disorder and/or be typical responses from anxiety, only in session 5 it was possible to observe the cleaning response (in sessions 4 and 6 no behavior besides playing was observed while in session 5 the subject spent 62 seconds on cleaning surfaces). Also, the licking behavior came up for the first time when the anxiogenic stimulus was presented. It is noted that in the session where there were toys of high preference, that behavior was not displayed even when the anxiogenic stimulus was presented. It is important to notice that the licking behavior lasted longer (in seconds) on the third day, when the

child was proposed to do the activities he usually avoided. This information leads to the assumption that this behavior might be an avoidance response. It is possible to notice in Figure 3 that the licking behavior increased gradually throughout sessions 7, 8, and 9. In session 8, when there was the anxiogenic stimulus and the child was also required to perform aversive activities, he licked his hands for 18 seconds. In session 9, however, in which the baseline conditions were set up again, the child spent 52 seconds performing that behavior. This information allows us to suppose that the environment for data collection might have acquired conditioned aversive properties which led to that behavior even when there was no anxiogenic stimulus (dirt).

The data on the behavior of cleaning the table during the sessions also shows that in the planned

situation it apparently does not play a task-avoiding role, as in session 8 – when there was the anxiogenic stimulus and task assignment – such behavior lasted for a period of time shorter than in the sessions where besides the anxiogenic stimulus there were toys of medium preference (session 2) and toys of high preference (session 5).

Figure 3 also indicates that the nail-biting behavior is first displayed in session 8, the session in which the child was expected to spend longer on avoidance responses and typical responses from anxiety, once in it the conditioned aversive stimulus (dirt) was coupled with the performance of aversive tasks. It is noted that such behavior did not come up in session 9 (in which only toys of medium preference were presented), which indicates that the nail-biting behavior might be linked to the avoi-

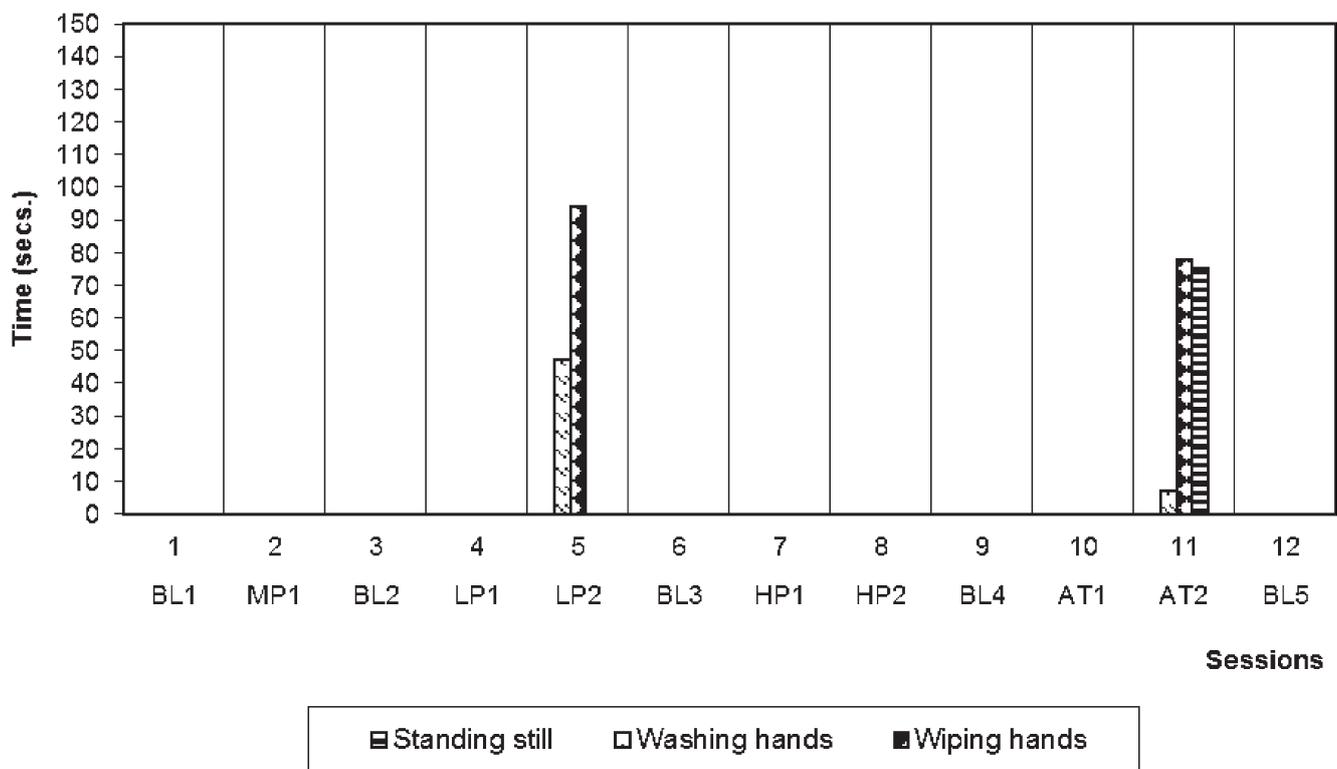


Figure 4: Obsessive-compulsive behaviors and behaviors related to anxiety in twelve sessions - Subject 2.

dance of the tasks proposed in session 8. It also can be observed that such behavior came up again in session 11, when low-preference toys were presented along with the anxiogenic stimulus.

We can also observe in Figure 3 the occurrence of the standing-still behavior in the session where there were medium preference toys added with the anxiogenic stimulus (session 2) and in the session with task assignment but without the anxiogenic stimulus (session 7).

Subject 2

We can observe in Figure 4 that the noted responses only came up in the experimental conditions in which the anxiogenic stimulus was added to low-preference toys (session 5) and to the aversive tasks (session 11).

Figure 4 indicates that the behaviors of washing hands, and of rubbing hands as well (on clothes or other surfaces) were displayed in two sessions: the one in which the low-preference toys were presented along with the anxiogenic stimulus (session 5); and the one where aversive activities were proposed together with the anxiogenic stimulus (session 11). It is also noted that the subject stood still only in session 11.

Therefore, it is important to notice that even when there was dirt together with “medium” or with “high-preference” toys, the child did not display any of the indicated behaviors. We can infer that those behaviors might be related, for this subject, to the poor-ness of the reinforcers available in the environment, and also to the avoidance of aversive stimulation.

We can observe that in the session with low preference toys and dirt (session 5), the noted beha-

viors came up for a period of time longer than in the session with aversive tasks and dirt (session 11). This fact points to the hypothesis that in the experimental conditions, for this subject, the rituals might be related to a greater extent to the poorness of the reinforcers than to task avoidance. Another possible interpretation is that the physical environment (dirt included) might have had its aversive effect lessened over time, once the functionality of the obsessive-compulsive behavior did not change throughout the experimental sessions, as the child was not allowed to stop performing the aversive activity while being studied.

Subject 3

Figure 5, built up the same way as Figures 3 and 4, shows the results gathered for subject 3.

Figure 5 indicates that in the sessions where there were aversive activities and the anxiogenic stimulus (session 5), high-preference toys (session 8), low-preference toys (session 11) and aversive activities, the behaviors noted as obsessive-compulsive can be observed. Among all the sessions with dirt, only in the session with medium-preference toys (session 2) none of the indicated behaviors were observed.

In the session with aversive tasks without the anxiogenic stimulus (session 4), the child engaged herself in carrying out the tasks all the time. However, in the session where there was the anxiogenic stimulus and assignment of aversive tasks (session 5), the child kept cleaning the table for 106 seconds, stood still for 62 seconds, and also spent 89 seconds on biting her nails. We infer that, although the assignment of aversive tasks was not enough to arise obsessive-compulsive behaviors, the presence of dirt led the subject to display three behaviors different from the

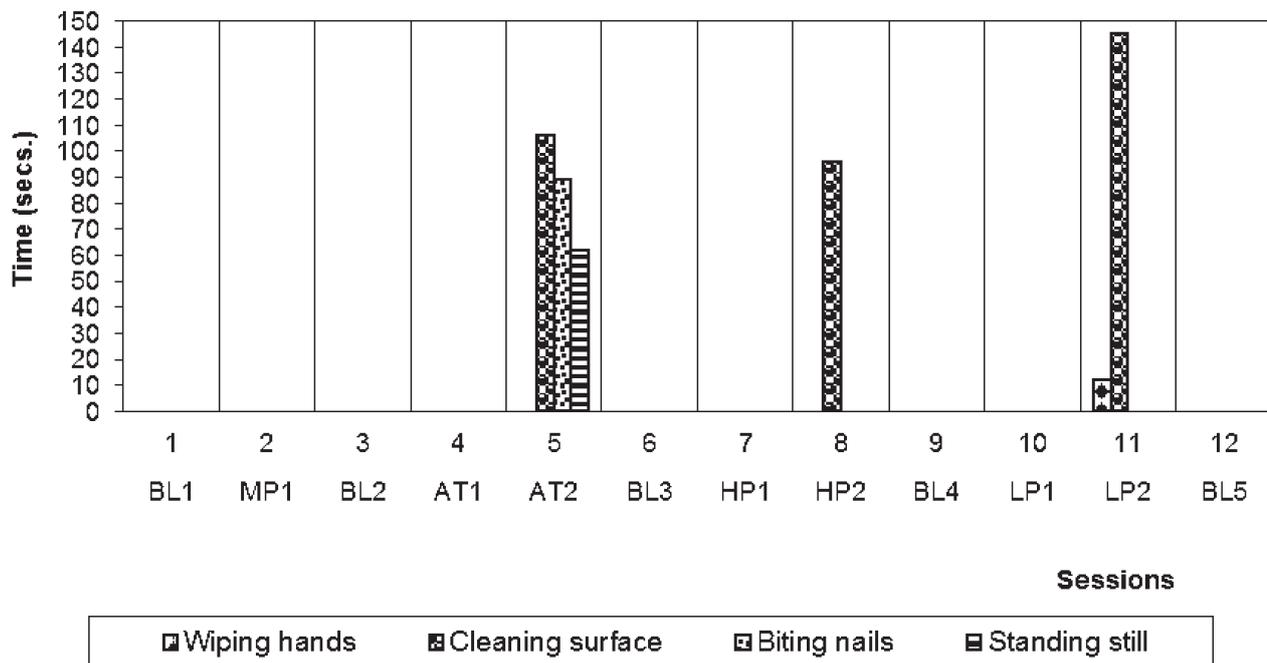


Figure 5: Obsessive-compulsive behaviors and behaviors related to anxiety in twelve sessions - Subject 3

performing of tasks, which suggests that the anxiogenic stimulus might at the same time conjure up anxiety and be a negative reinforcing stimulus.

A significant item of information observed in the sessions of subject 3 is in respect to the questions the child asked the researcher about the nature of the anxiogenic stimulus. In the sessions with medium preference toys and the anxiogenic stimulus (session 2), with aversive tasks and the anxiogenic stimulus (session 5), and low preference toys and the anxiogenic stimulus (session 11), the child asked repeatedly about the substance the researcher brought into the room. Some examples of her questions were: “What is this?” (this question was asked in the three sessions mentioned above, although the substance – melted chocolate – was the same in all of them); “Where did you buy this?”; “Where is it sold?”. We suppose those were checking questions; the child probably meant to make sure it was not something harmful.

A peculiarity in the behavior of Subject 3 can be noted: differently from the other children, in the session where there were high-preference items and dirt, she engaged herself for 96 seconds in cleaning the table. This information leads to two hypotheses: 1) for this subject, the behavior of cleaning is less likely to wane in the presence of possible reinforcers, if compared to Subjects 1 and 2; 2) the “dirt” stimulus might have acquired a more aversive value for her than for the other children, as in session 5, (the day before), it was associated with aversive tasks.

It is observable in Figure 5 that the “table cleaning” behavior lasted longer (145 seconds) in the session in which the low preference items were provided (session 11). Figure 5 also indicates that the table-cleaning behavior spanned 106 seconds in session 5, when aversive tasks were assigned. Finally, this behavior was displayed for 96 seconds in session 8, where there were high preference items.

The fact that the child displayed cleaning behaviors in session 5, when there was task assignment, points out to the hypothesis that these behaviors might play an avoidance role for the child.

DISCUSSION

In general, results are aligned with the specialized literature's main hypothesis.

As observed in Figures 3, 4, and 5, the sessions where there were high preference toys were generally those in which the rituals and other behaviors noted as possibly obsessive-compulsive lasted the least (except for subject 3, who among the sessions with dirt, displayed those behaviors less often when there were toys of medium preference). This information indicates that although the proposition of highly preferred activities does not always produce behaviors incompatible with the performance of rituals and of behaviors linked to anxiety, a shorter time is spent on obsessive-compulsive behaviors in this experimental condition.

As already stated, subjects 2 and 3 displayed rituals and other behaviors related to anxiety more often in sessions in which there were aversive tasks and the conditioned aversive stimulus (dirt). Secondly, the sessions in which a longer period of time spent on behaviors related to the problem are observed are those in which low-preference toys were provided.

This information leads to the hypothesis that the obsessive-compulsive behavior might have its likelihood increased for some individuals when the other stimuli of the environment produce few responses or produce specially avoidance responses.

In the case of this study, it is possible to affirm that low-preference toys were stimuli weaker than the toys of the "high frequency" category as regards the lessening of compulsive responses.

For all the subjects, rituals and other behaviors linked to anxiety were observed in the session where there was the aversive stimulus (dirt) and the aversive task assignment. We need to remember that in those sessions there were no toys available (they were present in all the other sessions), which means not only the introduction of averseness but also the removal of the possible reinforcing activities and stimuli.

The increase in the number of responses related to anxiety by the three subjects corroborates the hypotheses presented by some authors, such as Banaco (1997), Graña & Bayon (2000), Sidman (1995), and Zamignani (2000) as regards how the abundance of aversive stimulation might favor the obsessive-compulsive problem if the subjects do not have in their repertoire other avoidance responses or coping skills for managing aversive situations. This information also leads to the supposition that aversive situations tend to bring out typical responses to anxiety (Estes & Skinner, 1941; Sidman, 1995). It could be observed, for example, that the subjects of this study presented responses of nail-biting and standing still.

These data indicate that, although the stimulus used for conjuring up anxiety and for discriminating the performance of rituals might increase the likelihood of obsessive-compulsive behaviors for some individuals, other variables might be operating on the behavior in question, leading individuals to display rituals also when the conditioned aversive stimulus is lacking. These data support (although they do not

prove them) the hypotheses by Banaco (1997), Banaco & Zamignani (2004), Graña & Bayon (2000), Queiroz *et al* (1981), Vermes & Zamignani (2003) and Zamignani (2000) on the possibility of the various stimuli from the outside environment eventually play a role equivalent to the one played by the anxiogenic stimulus, thus increasing the likelihood of obsessive-compulsive behaviors.

The development of a therapeutic framework promoting advances for treating problems related to behavior must involve analysis and interference in the biological aspects and in the environment variables. The work of the physicians (usually psychiatrists) must involve a precise diagnosis as to the condition for the prescription of appropriate medication (Sturme, 1996). The work of behavior analysts, on their turn, must be focused on what they are in fact set to do: the changing of the environmental contingencies.

LIMITATIONS IN THE PRESENT STUDY

One of the problems of the procedure is related to the time sampling for data collection. The study was set up on the observation of each subject for only 3 hours (twelve 15-minute sessions). If compared to the exposure time in natural conditions, the time samplings are short (although it is clear that longer sessions would have practical implications on the study).

Another difficulty concerning the procedure employed was on experimental control. For the three subjects, there was a one-week break between each set of three sessions. Taking into account that probably the obsessive-compulsive behaviors are displayed in a natural situation and exposed to various consequences (to which the researcher had no access or control over), we can suppose that other va-

riables, extrinsic to the experiment, might have had an effect on the behaviors observed in the sessions, as for example, the contact with the ERP technique.

The planning of the study was based on the thought that the children might perform washing and cleaning rituals when exposed to certain stimuli. However, the data analysis shows that the performance of behaviors possibly linked to the obsessive-compulsive problem was not displayed for a long time by any of the children. Conversely, the reports from the subjects themselves and their mothers suggest that such behaviors are frequent and lengthy. Such discrepancy of information might have been due to the fact that the obsessive-compulsive behaviors, differently from the self-injurious ones, for example, might be displayed between large intervals, so the short duration of the experimental sessions carried out in this study might have raised difficulties for obtaining the recorded behaviors, and for the analysis of the variables that might control such behaviors as well. A piece of information worth-considering in interpreting the data concerns the psychological and drug therapy applied to the three subjects, parallel to this study. In this regard, it is relevant to stress that subjects 1 and 3 were on psychiatric drug medication while subject 2 was on the ERP therapy. In fact, we suppose that if the time spent on the rituals had been the ones presented in this study, it would have been very probable that these subjects would not have been diagnosed as OCD patients.

It is necessary to stress the fact that the stimuli that often trigger the rituals and anxiety were not available in the room. Stimuli with some similar physical properties (color, consistency, and viscosity) were selected and presented to the children without a previous testing to check if they displayed avoidance of

contact with them. Considering that providing some stimuli such as feces would be inadequate, attenuated stimuli were chosen. According to the assumptions previously pointed out, they (melted milk candy and chocolate) were probably less anxiogenic.

Another question to be raised is related to the providing of high preference toys. Their use was based on the hypothesis according to which reinforcing activities might lessen the likelihood of ritual performance. Nevertheless, literature indicates that the contingency of positive reinforcement contingent on obsessive-compulsive responses is related mainly to social attention (Banaco, 1997; Graña & Bayon, 2000; Queiroz *et al*, 1981; Vermes & Zamignani, 2003; Zamignani, 2000). Although the use of toys in this study aimed at producing a model of functional relation, the application of social attention in an experimental session might bring forth data different from the ones presented. Also, it would be closer to the hypotheses provided by literature. We suggest new studies that will address these questions.

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Recebido em 10 de abril de 2012
Revisado em 2 de abril de 2013
Aceito em 5 de maio de 2013