Archives of Psychiatry and Behavioral Sciences

ISSN: 2638-5201 | Volume 4, Issue 1, 2021

DOI: https://doi.org/10.22259/2638-5201.0401004

Functional Analysis of a Hair Pulling Behavior with a Trichotillomaniac Teenager: Placebo, Family, & Therapist Effects

Charlotte Renaux[1], Vinca Rivière (BCBA-D©)[1], M.L. Joëlle Nuchadee (BCBA©)[1]

[1]Univ.Lille, CNRS, UMR9193 – SCALab – Sciences Cognitives et Sciences Affectives, F-59000 Lille, France.

***Corresponding author:** Charlotte Renaux, Université de Lille, North of France, Domaine universitaire du « Pont de Bois », Rue du Barreau – BP 6014959653 Villeneuve d'Ascq Cedex, France.*

Abstract

The purpose of this study was to determine the function(s) of a hair-pulling behavior maintained for 12 years. The participant was a 16-year old teenager with a diagnosis of trichotillomania. During the initial analogue assessment, we tested the typical conditions, namely, Attention, No Contingent Attention, and Demand. Then, we evaluated the use an anesthetic cream and demonstrated a placebo effect of the cream in addition to an therapist's effect by comparing the experimental conditions between family members and the therapist. Thus, our study underlined the complexity of conducting a functional analysis on a patient with a rare and complex pathology (i.e., trichotillomania). Treatment options are discussed according the results of the functional analysis.

Keywords: *functional analysis, trichotillomania, placebo effect, therapist effect.*

Introduction

Trichotillomania is characterized by the patients' (A) continuous pulling out of personal hair with resultant hair loss, (B) repeated attempts to stop hair pulling causing (C) clinically significant distress in social, occupational, or other important areas of functioning. Moreover, trichotillomania must (D) not be attributable to a nonpsychological medical reason, and (E) cannot be explained by the symptoms of another mental disorder (American Psychiatric Association, 2013). Although trichotillomania is often targeted for head hair, other areas of the body can be affected (Duke, Keeley, Geffken, & Storch, 2010). The prevalence of trichotillomania ranges from 1 to 3% with a significant female predominance (Anwar, & Jafferany, 2019).

Few studies have studied functions of hair-pulling because of its complexity. The first such study, Woods and Miltenberger (1996), examined whether these behaviors were maintained by anxiety or by boredom. In that study, participants were placed into two distinct conditions: anxiety (i.e., a stressful task), neutral (i.e., choice and viewing of an entertaining video), and anxiety again. Results showed a higher percentage of hair pulling in the anxiety condition compared to the neutral condition.

Other later studies support the view that hair pulling can be maintained by social consequences (Grace, Thompson, & Fisher, 1996). Here, three conditions were tested: a medical attention (i.e., physical examination and medical interviews by only a nursing staff), non-medical attention (i.e., conversations with a non-medical therapist about a variety of topics like music or friends), and a control condition (i.e., no differential consequences). Results showed higher percentages of hair pulling in non-medical and medical attention compared to control condition, which suggests that behavioral disorder was reinforced by attention. Nowadays, the majority of published studies focused on trichotillomania have supported the view that auto-hair pulling is maintained by avoiding anxiety, one might suspect that hair pulling may function to

reduce unwanted emotions and is thus reinforced (Anwar, & Jafferany, 2019). In contrast, other studies have suggested that hair pulling behavior was maintained by automatic positive reinforcement. That means, hair pulling could be emitted during periods of low stimulation in a boring environment (Stein et al., 1995).

The purpose of the current study was to determine the function(s) of a hair-pulling behavior in a case study to help identify future treatment options by testing a placebo effect as a preliminary treatment. In this experiment, we first used typical conditions like Attention, Control, and Demand (Iwata et al., 1994), introducing them as an anesthetic cream in our research. Our goal was first to determine if the target behavior was maintained by social consequences or by auto-stimulation, and if the latter, then to find out which auto-stimulation was the reinforcer (i.e., products of behavior like hairs in the hand; or hair pulling sensations). Finally, we sought to explore the generalization of the hair pulling across people, by comparing the results obtained with the educator and those obtained with family members.

Method

Participant and Target Behavior

The participant, N, was a 16-year-old French woman with a diagnosis of trichotillomania since she was 5. The target behavior was defined as the gripping with her fingers of hairs, on whatever parts of her body (head, eyelashes, eyebrows, feet, legs, arms), with or without their extraction. This hair pulling behavior results in a loss of eyelashes, scars and bleeding on her legs, and noticeable hair loss with areas of baldness on her scalp. This hair pulling behavior also has social effects like stigmatization by peers and the participant's low self-esteem. At our first meeting, N was very inclined to work with us. Her family signed a consent paper before the implementation of the functional analysis.

Functional Analysis

Some information was collected by interviews before the completion of functional analysis in order to generate hypotheses. The target behavior was continuously emitted until there was no more hair on the anatomical location of N's current attention. Then, when an area of the participant's body was hairless, behavior occurred on another zone and so on. Appendix 1 shows that target behavior appeared in any location and at any time (alone, at school, with friends/family/students/staff members). Moreover, Appendix 1 underlines the ineffectiveness of reprimands as consequences of behavior.

Hypotheses about Function(s) of the Target Behavior

Our descriptive analysis supported some studies which have demonstrated that hair pulling behavior was maintained by automatic positive reinforcement. For example, some authors think that behavior is emitted during periods of low stimulation (Stanley, & Cohen, 1999), which is consistent with the behavior being maintained by automatic positive reinforcement. In our functional analysis, two major hypotheses were tested. First, the target behavior could be maintained by obtaining products (i.e., hairs in the hands). Second, this behavior could be maintained by the stimulation of hair tearing. Thus, we tested these two major hypotheses, while assessing other possible social assumptions.

Response Measurement and Interobserver Agreement

The number of target behaviors were collected by intervals of 30 seconds, because of its high emission probability (Irvin et al., 1996). The duration of these sessions was 15 minutes to provide sufficient time for the target behavior to be emitted (Iwata et al., 2000). The data were converted into percentages of intervals with target behavior occurrence, by dividing the number of occurrence' intervals by the total number of intervals (i.e., 30 intervals per 15 min-session). All sessions were recorded by the therapist and the family members with a camera in order to achieve an inter-observer agreement. After viewing and rating, this agreement was 98.5%.

Staff Training

The therapist was trained to implement a functional analysis, using Behavioral Skills Training (Miltenberger et al., 2004). With instructions, modeling, repetition and feedback, the therapist and family members were first trained on the conditions before the beginning of the functional analysis.

Experimental Design

Each experimental condition was divided into 3 sessions of 15 minutes. The first conditions Attention, No Contingent Attention, and Demand were selected using a pseudo-random order, and performed by the educator. Condition Anesthetic cream was performed by family member 1 few days after the first set of conditions. Because of academic constraints, the conditions No Contingent Attention and Hairs were performed a month later by family member 2. Similarly, one last condition, Control, was conducted by the therapist.

Experimental Conditions

This functional analysis was carried out over 2 months (March-May 2015). Except for the condition Anesthetic cream, these experimental conditions were inspired by research of Rapp (2000) and Miltenberger, Rapp, and Long (2004).

Condition Attention: At baseline, the therapist was interacting with someone else, not providing attention to N. If the target behavior was emitted, attention to N was delivered. For example, the therapist was looking at his phone when N began to pull her hair. Following the emission of the target behavior, the therapist gave attention to N by saying "Are you okay, N?".

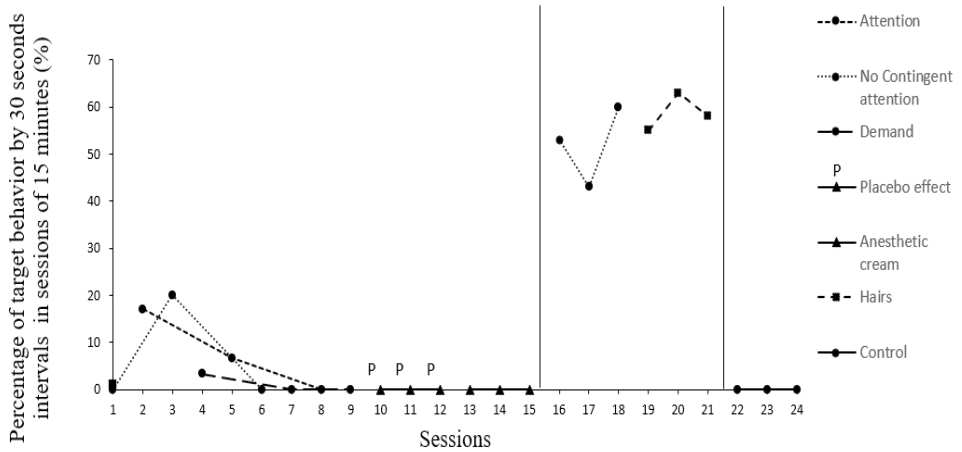
Condition No Contingent Attention: The therapist (represented with circles in Figure 1) or the family member 2 (represented with squares in Figure 1) interacted with N in a usual context (i.e., living room & lunchroom) delivering normal attention. Attention was not contingently delivered for emitting the target behavior. If the target behavior was emitted, an extinction procedure was used.

Condition Demand: The therapist asked several consecutive questions to N, about stress-provoking topics (i.e., school, bad grades, or conflictual social relations). The therapist stopped it when the target behavior was emitted.

Condition Hair: N was handling a doll with long hairs attached, whose touch was similar to human hair. Family member 2 discreetly watched and counted emissions of the target behavior.

Condition Anesthetic Cream: An anesthetic cream (i.e. lidocaine) was applied to the eyebrows and the girl's arms. The anesthetic effect occurred 45 minutes after application and inhibited most sensation of pulling hairs. Data collection of the target behavior focused on areas to which cream was applied application.

Condition Control (Named "Control" because Similar to the Natural Environment): The therapist interacted with N by using music, funny videos, jokes, and games, providing much stimulations. If the target behavior was emitted, an item (i.e., songs, games) was proposed.



Percentage of target behavior under the conditions Attention, No Contingent Attention, Demand, Anesthetic cream, Hairs and Control, according to staff members (● for the therapist ; ▲ for family member 1 ; ■ for family member 2)

Figure1. *Percentage of target behavior under the conditions Attention, No Contingent Attention, Demand, Anesthetic cream, Hairs, and Control, according to staff members.*

Results

Figure 1 displays occurrences of the target behavior under the six experimental conditions. The first three were conducted by the therapist (Conditions Attention, No Contingent Attention, and Demand). Results show that target behaviors were infrequently issued in No Contingent Attention conducted by the therapist compared to the condition No Contingent Attention conducted by the family. The same results were observed for Conditions Attention conducted by the therapist or the family member. This means that presence of the educator had an effect on the target behavior.

Moreover, the condition Anesthetic cream shows a placebo effect: No target behavior was emitted before anesthetic effects (occurring 45 min after application) on areas with cream or not. Neither was the target behavior emitted after the effects of the cream began to act.

Furthermore, the Condition Hairs shows a high frequency of the target behaviors' occurrence. Indeed, N manipulated the doll with long hairs while tearing her own hair. Conversely, no target behavior was emitted when there was lots of stimulation (i.e., Condition Control).

Target behaviors were emitted at a high frequency in Conditions No Contingent Attention conducted by family and Hairs, demonstrating the need of family serving as staff members in therapies to control some variables which are not accessed to experimenters. Conditions Placebo and Anesthetic cream show that the function of the target behavior was maintained by the sensation of pulling-out hair, not by the permanent product (i.e., hairs). The Condition Control supports this hypothesis by showing no occurrence of the target behavior. However, we may wonder why the occurrence frequency is so low in Conditions Attention and No Contingent Attention conducted by the therapist, and Demand. In fact, if the target behavior was maintained by auto-stimulation (precisely, the sensation of pulling out hair), the target behavior should had been consistently emitted and observed across all conditions. We can explain these results by contrasting the therapist's application and family's application of No Contingent Attention, that is, there is an therapist's effect.

Discussion

Even if behaviors can be maintained by several environmental consequences over a long time (Derby et al., 1997), being multifunctional (Vorndran et al., 2008), we demonstrate that this target behavior had been maintained by hair pulling stimulations, at least during the period of functional analysis. We also demonstrated a placebo effect using an anesthetic cream, which could be easily used in behavioral programs as a non-drug treatment combined with others. Finally, we highlighted the need of family/ closer persons to the patient treatment in behavioral programs.

No medication for trichotillomania has proved effective. However, the combination of habit reversal therapy with pharmacological treatment seems to be promising. Habit reversal sessions that occur weekly and involve self-monitoring, prevention training, and stimulus control techniques have had promising results (Anwar & Jafferany, 2019). Combined with Nacetylcysteine (i.e., anti-psychotic), good results have been obtained in treatment for adults with trichotillomania (Castillo, Enos, Franca, 2015). Others drugs treatments have also been shown to be effective such as the use of clomipramine in a short-term treatment of trichotillomania (Swedo et al., 1989), and the use of risperidone and naltrexone in a geriatric case report (Oravecz, & Stuhec, 2014).

In parallel with medical treatments, behavioral therapy is considered effective in the treatment of trichotillomania (Bloch et al., 2007).For example, Lerner et al. (1998) demonstrated the effectiveness of a cognitive behavioral treatment program on 36 individuals of ages 8 to 61 years with trichotillomania. A CBT program including self-monitoring, habit reversal, stimulus control, relaxation training, and relapse prevention methods was used during nine 1-hour sessions conducted individually and weekly. Self monitoring of hair pulling occurrences was assigned throughout the program. Lerner et al. (1998) observed an immediate effectiveness of CBT with a significant reduction of hair pulling (at least a reduction of 50% comparing with baseline). However, the authors underlined the difficulty of follow up the long term effects of CBT by observing relapses few months later the end of the program.In an effort to address this limitation,pre-treatment variables namely, levels of depression and trichotillomaniasymptom

severity have been investigated. Keijsers et al. (2006) investigated long-term behavioral therapy treatment outcome for patients with trichotillomania and observed better 2-year follow-up results in patients with lower pre-treatment levels of depressive symptoms. Moreover, the authors also obtained results that confirm Lerner et al's hypothesis that complete abstinence from hairpulling would result in optimal operant and classical deconditioning. It would be interesting to further investigate gain maintenance of behaviour therapy (BT) for trichotillomania in the long term with regards to pre treatment variables and to the components of treatment protocols.

References

[1] Anwar, S., & Jafferany, M. (2019). Trichotillomania: A psychopathological perspective and the psychiatric comorbidity of hair pulling. Acta Dermatovenerologica Alpina, Pannonica, et Adriatica, 28(1), 33-36.

[2] American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed., text rev.). Washington, DC & London England.

[3] Bloch, M. H., Landeros-Weisenberger, A., Dombrowski, P., Kelmendi, B., Wegner, R., Nudel, J., ... & Coric, V. (2007). Systematic review: pharmacological and behavioral treatment for trichotillomania. Biological Psychiatry, 62(8), 839-846.

[4] Castillo D, Enos C, Franca K, et al. Pharmacotherapy. In: Franca K, Jafferany M, editors. Trichotillomania (hair pulling disorder): clinical characteristics, psychological interventions and emotional effects. New York: Nova Science Publishers; 2015. p. 55

[5] Derby, K.M., Wacker, D.P., Berg, W., DeRaad, A., Ulrich, S., Asmus, J., Harding, J., Prouty, A., Laffey, P., & Stoner, E.A. (1997). The long-term effect of functional communication training in home settings. Journal of Applied Behavior Analysis, 30, 507-531.

[6] Duke, D. C., Keeley, M. L., Geffken, G. R., & Storch, E. A. (2010). Trichotillomania: A current review. Clinical Psychology Review, 30, 181–193.

[7] Grace, N. C., Thompson, R., & Fisher, W. W. (1996). The treatment of covert self-injury through contingencies on response products. Journal of Applied Behavior Analysis, 29(2), 239–242.

[8] Irvin, D.S., Realon, R.E., Hartley, J.R., Bradley, F., & Daly, M. (1996). The treatment of self-injurious hand mouthing by using a multi-component intervention with individuals positioned in a small group. Journal of Developmental and Physical Disabilities, 8(1), 43-59.

[9] Iwata, B.A., Wallace, M.D, Kahng, S.W., Lindberg, J.S., Roscoe, E.M., Conners, J., Hanley, G.P., Thompson, R.H, Worsdell, A.S. (2000). Skill acquisition in the implementation of functional analysis methodology. Journal of Applied Behavior Analysis, 33, 181-194.

[10] Iwata, B. A., Dorsey, M. F., Slifer, K. J., Bauman, K. E., & Richman, G. S. (1994). Toward a functional analysis of self-injury. Journal of Applied Behavior Analysis, 27(2), 197-209.

[11] Keijsers, G. P., van Minnen, A., Hoogduin, C. A., Klaassen, B. N., Hendriks, M. J., & Tanis-Jacobs, J. (2006). Behavioural treatment of trichotillomania: Two-year follow-up results. Behaviour research and therapy, 44(3), 359-370.

[12] Lerner, J., Franklin, M. E., Meadows, E. A., Hembree, E., & Foa, E. B. (1998). Effectiveness of a cognitive behavioral treatment program for trichotillomania: An uncontrolled evaluation. Behavior Therapy, 29(1), 157-171.

[13] Miltenberger, R.G., Flessner, C., Gatheridge, B., Johnson, B., Satterlund, M., Egemo, K. (2004). Evaluation of behavioral skills training to prevent gun play in children. Journal of Applied Behavior Analysis, 37, 513-516.

[14] Oravecz R, Stuhec M. (2014). Trichotillomania successfully treated with risperidone and naltrexone: a geriatric case report. Journal of the American Medical Directors Association, 15, 301–2.

[15] Rapp, J. T. (2000). Treatment of hair pulling and hair manipulation maintained by digital-tactile stimulation. Behavior Therapy, 31, 381-393.

[16] Rapp, J. T., Miltenberger, R. G., Long, E. S., Elliott, A. J., & Lumley, V. A. (1998). Simplified habit reversal treatment for chronic hair pulling in

three adolescents: A clinical replication with direct observation. Journal of Applied Behavior Analysis, 31(2), 299-302.

[17] Stein, D. J., Simeon, D., Cohen, L. J., & Hollander, E. (1995). Trichotillomania and obsessive-compulsive disorder. The Journal of clinical psychiatry, (Suppl 4), 28–34.

[18] Swedo SE, Leonard HL, Rapoport JL, Lenane MC, Goldberger EL, Cheslow DL. (1989). A double-blind comparison of clomipramine and desipramine in the treatment of trichotillomania (hair pulling). New England Journal of Medicine, 321, 497–501.

[19] Vorndran, C.M, Pace, G.M., Luiselli, J.K., Flaherty, J., Christian, L., & Kleinman, A. (2008). Functional analysis and treatment of chronic hair pulling and covariant thumb sucking in a child with Cri du Chat syndrome. Behavior Analysis in Practice, 1, 5-10.

[20] Woods, D.W., & Miltenberger, R.G. (1996). Are people with nervous habits nervous? A preliminary examination of habit function in a nonreferred population. Journal of Applied Behavior Analysis, 29, 259-261.

Appendix 1: ABC-Analysis of the target behavior.

Appendix 1

Antecedent	Behavior	Consequence
Alone, watching television	Pulls her hairs	"Feels better"
At school	Pulls her hairs	"Feels better"
With someone without speaking	Pulls her hairs	Reprimand "Withdraw your fingers"
Talking with someone	Pulls her hairs	Reprimand "Withdraw your fingers"
In her bed	Pulls her hairs	"Feels better" and sleeps

ABC-Analysis of the target behavior.

Citation: **Charlotte Renaux, Vinca Rivière, M.L. Joëlle Nuchadee.** *Functional Analysis of a Hair Pulling Behavior with a Trichotillomaniac Teenager: Placebo, Family, & Therapist Effects. Archives of Psychiatry and Behavioral Sciences. 2021; 4(1): 23-28. DOI: https://doi.org/10.22259/2638-5201.0401004.*